United Nations A/66/307

General Assembly

Distr.: General
15 August 2011

Original: English

Sixty-sixth session
Agenda item 76 (b) of the provisional agenda*
Oceans and the law of the sea: sustainable fisheries, including through the 1995 Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December 1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, and related instruments

Actions taken by States and regional fisheries management organizations and arrangements in response to paragraphs 80 and 83 to 87 of General Assembly resolution 61/105 and paragraphs 113 to 117 and 119 to 127 of General Assembly resolution 64/72 on sustainable fisheries, addressing the impacts of bottom fishing on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks

Report of the Secretary-General

Summary

The present report has been prepared pursuant to paragraph 122 of General Assembly resolution 65/38 of 7 December 2010, requesting the Secretary-General, in cooperation with the Food and Agriculture Organization of the United Nations, to report to the General Assembly at its sixty-sixth session on the actions taken by States and regional fisheries management organizations and arrangements in response to paragraphs 80 and 83 to 87 of resolution 61/105 and paragraphs 113 to 117 and 119 to 127 of resolution 64/72, in order to facilitate the further review of the actions taken referred to in paragraph 129 of resolution 64/72.

* A/66/150.

11-45366 (E) 190911

Please recycle

The report is a follow-up to earlier reports prepared by the Secretary-General (A/64/305 and A/61/154). It should also be read in conjunction with earlier interim reports of the Secretary-General on the measures taken by States and regional fisheries management organizations and arrangements to implement resolution 61/105 (A/62/260, paras. 60-96, and A/63/128, paras. 63-78).

Contents

		Page
	Abbreviations	4
I.	Introduction	6
II.	Overview of the impacts of bottom fisheries on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks	7
	A. Vulnerable marine ecosystems: an updated review	7
	B. Deep-sea fish stocks	10
	C. Impacts of bottom fishing on vulnerable marine ecosystems and deep-sea fish stocks	11
III.	Actions taken by States and regional fisheries management organizations and arrangements to address the impacts of bottom fisheries on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks	14
	A. Actions taken by regional fisheries management organizations and arrangements with competence to regulate bottom fisheries	15
	B. Actions taken by States to regulate bottom fisheries	24
	C. Actions taken by States and competent regional fisheries management organizations and arrangements in cooperating to collect and exchange scientific and technical data and information and develop or strengthen data-collection standards, procedures and protocols and research programmes	38
IV.	Activities of the Food and Agriculture Organization of the United Nations to promote the regulation of bottom fisheries and the protection of vulnerable marine ecosystems	44
	A. Developing tools for the implementation of the International Guidelines for the Management of Deep-sea Fisheries on the High Seas of the Food and Agriculture Organization of the United Nations	45
	B. Establishing a global database of information on vulnerable marine ecosystems beyond national jurisdiction	46
V.	Concluding remarks	47
Annex		
	List of respondents to the questionnaire	49

Abbreviations

CACFish	Central Asean and Caucasus Regional Fisheries and Aquaculture Commission
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
FAO	Food and Agriculture Organization of the United Nations
FAO Guidelines	International Guidelines for the Management of Deep-sea Fisheries in the High Seas of the Food and Agriculture Organization of the United Nations
FFA	Pacific Islands Forum Fisheries Agency
GEF	Global Environment Facility
GFCM	General Fisheries Commission for the Mediterranean
GPA	Global Programme of Action for the Protection of the Marine Environment from Land-based Activities
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
IMO	International Maritime Organization
ISA	International Seabed Authority
IUU fishing	Illegal, unregulated and unreported fishing
MPA	Marine-protected area
NAFO	Northwest Atlantic Fisheries Organization
NASCO	North Atlantic Salmon Conservation Organization
NEAFC	North East Atlantic Fisheries Commission
NPFC	North Pacific Fisheries Commission
OSPAR	Convention for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Convention)
RFMO/A	Regional fisheries management organization or arrangement
NEREIDA	NAFO Potential Vulnerable Marine Ecosystem-Impacts of Deep-sea Fisheries project

SEAFO	South East Atlantic Fisheries Organization
SIOFA	South Indian Ocean Fisheries Agreement
SPRFMO	South Pacific Regional Fisheries Management Organization
VME	Vulnerable marine ecosystem
WCPFC	Western and Central Pacific Fisheries Commission

I. Introduction

1. In resolution 64/72 of 4 December 2009, the General Assembly, inter alia, welcomed the important progress made by States, regional fisheries management organizations or arrangements (RFMO/As) and those States participating in negotiations to establish a RFMO/A competent to regulate bottom fisheries to give effect to paragraphs 80 and 83 to 87 of resolution 61/105 and address the impacts of bottom fishing on vulnerable marine ecosystems (VMEs) and the long-term sustainability of deep-sea fish stocks.

2. On the basis of its review, the General Assembly considered that further actions, in accordance with the precautionary approach, ecosystem approaches and international law were needed to strengthen the implementation of these paragraphs, and called upon RFMO/As with the competence to regulate bottom fisheries, States participating in negotiations to establish such organizations or arrangements, and flag States to take the additional actions described in the present report. The General Assembly also called upon States to take action immediately, individually and through RFMO/As, to implement the 2008 International Guidelines for the Management of Deep-sea Fisheries in the High Seas of the Food and Agriculture Organization of the United Nations[1] in order to sustainably manage fish stocks and protect VMEs from destructive fishing practices.

3. In addition, the General Assembly decided to conduct a further review at its sixty-sixth session in 2011 of the actions taken by States and RFMO/As in response to the relevant paragraphs in resolutions 61/105 and 64/72, with a view to ensuring effective implementation of the measures and to make further recommendations, where necessary.

4. Following the adoption of resolution 65/38, requesting the Secretary-General to report to the General Assembly at its sixty-sixth session on the above-mentioned actions, the Secretary-General circulated a questionnaire to States, regional economic integration organizations and RFMO/As, inviting them to submit information on actions taken to implement the relevant resolutions with a view to facilitating a further review. Information was also requested from the Food and Agriculture Organization of the United Nations (FAO).

5. In response, submissions were received from 19 States, the European Union, 12 RFMO/As and FAO (see annex). The present report is based on the information therein provided, as well as other relevant information. The Secretary-General wishes to express his appreciation for these submissions.

[1] Food and Agriculture Organization of the United Nations, *Report of the Technical Consultation on International Guidelines for the Management of Deep-sea Fisheries in the High Seas, Rome, 4-8 February and 25-29 August 2008*, FAO Fisheries and Aquaculture Report No. 881.

II. Overview of the impacts of bottom fisheries on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks

A. Vulnerable marine ecosystems: an updated review

6. As previously reported,[2] the vulnerability of an ecosystem is related to the likelihood that one or more components (i.e., population, community or habitat) will experience substantial alteration owing to short term or chronic disturbance, and the likelihood that it will recover, and in what time frame. The most vulnerable ecosystems are those that are both easily disturbed and very slow to recover, or may never recover.[3] Within ecosystems, seamounts, hydrothermal vents and cold-water corals may be regarded as ecotopes, which are expected to occur as numerous, small patches, scattered among areas of larger ecosystems.[1]

7. Earlier reports of the Secretary-General provided detailed descriptions of VMEs, in particular VMEs in the deep-sea beyond the limits of national jurisdiction.[4] The following section provides an updated review on these VMEs.

1. Seamounts

8. Ecological paradigms have created a widely held view of seamounts, which are bathymetric features, as unique environments, hotspots of biodiversity and endemicity and fragile ecosystems of exceptional ecological worth. However, most of the scientific paradigms concerning seamount ecosystems are based on a very limited number of quantitative studies. Of the many thousands of seamounts worldwide, only around 300 have been sampled extensively by scientific standards.[5]

9. A recent review of the evolution of the major paradigms in seamount ecology has revealed significant gaps in knowledge and called into question the accuracy of some of these paradigms.[6] Assertions that seamount communities are vulnerable to fishing and have high sensitivity and low resilience to bottom trawling disturbance were well supported by existing data. Physical disturbance or destruction of sessile

---

[2] See A/64/305, para. 9.

[3] See Food and Agriculture Organization of the United Nations, *Report of the Technical Consultation on International Guidelines for the Management of Deep-sea Fisheries in the High Seas, Rome, 4-8 February and 25-29 August 2008*, FAO Fisheries and Aquaculture Report No. 881; see also the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas, paras. 14-16.

[4] See, for example, A/58/65, A/59/62, A/60/63/Add.1, A/61/154, A/64/305.

[5] The estimated number of seamounts depends on definitions, and the diversity of seamounts is considerable in terms of morphology, summit depth, and association with other major structures such as mid-ocean ridge and continental slopes. For recent studies, see T. A. Schlacher, et al., eds., "Recent advances in seamount ecology", in *Marine Ecology*, vol. 31 (Suppl.1) (2010); M. R. Clark, et al., "The Ecology of Seamounts: Structure, Function, and Human Impacts", in *Annual Review of Marine Science*, vol. 2 (2010); T. J. Pitcher, et al., eds., *Seamounts: Ecology, Fisheries, and Conservation*, Fisheries and Aquatic Resources Series 12 (Oxford, Blackwell Publishing, 2007); A. N. Mironov, et al., eds., *Biogeography of the North Atlantic Seamounts* (Moscow, KMK Scientific Press Ltd., 2006).

[6] See A. A. Rowden, et al., "Paradigms in seamount ecology: fact, fiction and future", in *Marine Ecology*, vol. 31 (Suppl.1) (2010); CenSeam project of the Census of Marine Life programme. Available at http://censeam.niwa.co.nz.

communities with low productivity and rapid depletion of highly valued fish species that tend to aggregate at seamounts were well documented. However, the generalization that seamounts are island habitats with highly endemic faunas that comprise unique communities distinct in species composition from other deep-sea habitats was not generally supported. Obtaining evidence for endemism required very extensive sampling, and there had been some misuse of this term. In addition, the general belief that seamount communities have high production supported by localized production in bottom-up processes was not generally supported. The biomass and abundance of seamount-associated organisms may be high, but the production depended on a combination of localized production and input from adjacent ocean areas.

10. There was, however, evidence to support the notion of seamounts as stepping stones for dispersal, oases of abundance and biomass, and hotspots of species richness, but present sampling levels were too low to establish these generalities. Benthic diversity could be comparable to that observed on continental margins.[7] Further investigation was also needed into emerging paradigms that seamount communities were structurally distinct, that populations of invertebrates on seamounts were the source of propagules for nearby slope sinks, and that seamounts might act as biological refugia from large-scale catastrophic environmental events. Genetic studies documented complex connectivity patterns between seamounts and other habitats, depending on spatial scales and life history features of the organisms investigated.[8]

2. Hydrothermal vents

11. Hydrothermal vents sustaining benthic and benthopelagic communities driven by chemosynthetic processes were first discovered in the late 1970s.[9] At mid-ocean ridges, interaction among the liquid magma from the Earth's mantel, gases and water at extreme pressures create high-temperature deep-sea vents rich in chemicals that feed bacteria at the base of unique food chains. Other chemosynthetic systems are cold (cold seeps), which were first discovered along ocean margins in the Gulf of Mexico. The energy and matter derived from chemosynthetic processes at vents (and other deep features, such as cold seeps) is very minor compared with that generated by photosynthesis.

12. While widespread and probably more common than anticipated, hydrothermal vents are relatively small and localized maritime features. They typically occur at divergent plate boundaries (mid-ocean ridges) and convergent plates where back-arc spreading centres occur, in all oceans and at all latitudes. While the diversity of vent communities is low, endemism is high. Diversity in life history strategies of vent

[7] See T. A. Schlacher, et al., "Seamount science scales undersea mountains: new research and outlook", in *Marine Ecology*, vol. 31 (Suppl.1) (2010).

[8] See, for example, T. Shank, "Seamounts. Deep ocean laboratories of faunal connectivity, evolution, and endemism", in *Oceanography*, vol. 23 (2010); W. Cho and T. M. Shank, "Incongruent patterns of genetic connectivity among four ophiuroid species on North Atlantic seamounts", in *Marine Ecology*, vol. 31 (Suppl.1) (2010).

[9] See L. A. Levin, et al., eds., "Advances in Vent, Seep, Whale- and Wood-Fall Biology", in *Marine Ecology*, vol. 28 (2007); C. R. Fischer, et al., "Hydrothermal vent ecosystems", in *Oceanography*, vol. 20, No. 1 (2007); M. Baker, et al., "Biogeography, ecology, and vulnerability of chemosynthetic ecosystems in the deep-sea", in *Life in the World's Oceans*, A. D. McIntyre, ed. (United Kingdom, Blackwell Publishing, 2010).

organisms is also probably high.[10] As new vent sites are being discovered, and with them a range of new associated species, early biogeographical theories are being tested and modified.[11]

13. Of the vulnerable communities associated with chemosynthetic features, communities associated with cold seeps are probably more at risk of disturbance from human activity than those at hydrothermal vents. Cold seeps occur in soft-bottom continental shelf and slope areas where activities such as bottom trawling and petrochemical extraction are more extensive.

3. Cold-water corals and hydroids

14. Certain cold-water corals and hydrozoans,[12] primarily those potentially or actually forming forests, gardens and reefs, are members and indicators of vulnerable communities. Key taxa are stony corals (*Scleractinia*), alcyonaceans and gorgonians (*Octocorallia*), black corals (*Antipatharia*), and hydrocorals (*Stylasteridae*). Another group, primarily found on soft substrate, are the sea pens (*Pennatulacea*). Structured habitats formed by these taxa harbour diverse faunas that together may constitute a VME.

15. Cold-water corals are typically found along submerged edges and slopes, on summits and along margins of seamounts,[13] on upper continental slopes and ridge hills and in canyons and trenches. Many coral species have vast ranges and some species are reef-forming. Different species or species groups have particular habitat preferences and depth ranges, and, based on knowledge on such patterns, habitat suitability modelling have been used to "predict" distributions of certain coral taxa, e.g., *Lophelia*.

16. Stony coral reefs are ancient structures and deep-sea corals grow slowly and have the potential to live for thousands of years.[14] Reef ages may, therefore, be very high, but reefs are composed of some live and a large proportion of dead coral. Individual colonies seem to have the potential to grow quite rapidly, as shown by colonies frequently found attached to offshore oil rigs. But growth rates depend on food supply and environmental conditions, and deepwater corals are generally slow-growing.

17. Mapping of corals and coral habitats continues worldwide and, in recent years, significant portions of ridge, seamount and slope waters in the Atlantic, South-West

---

[10] Some vestimenferan tube worms can live to at least 200 years, but bivalves are comparatively short-lived. See E. E. Cordes, et al., "Patterns of growth in cold-seep vestimenferans, including *Seepiophila jonesi*: a second species of long-lived tubeworm", in *Marine Ecology*, vol. 28 (2007); J. P. Barry, et al., "Growth, production, and mortality of the chemosynthetic vesicomyid bivalve, *Calyptogena kilmeri* from cold seeps off central California", in *Marine Ecology*, vol. 28 (2007).

[11] See E. Ramirez-Llodra, et al., "Biodiversity and Biogeography of Hydrothermal Vent Species: Thirty Years of Discovery and Investigations", in *Oceanography*, vol. 20, No. 1 (2007).

[12] See J. Murray Roberts, et al., *Cold-Water Corals: The Biology and Geology of Deep-Sea Coral Habitats* (United Kingdom, Cambridge University Press, 2009).

[13] See A. D. Rogers, et al., "Corals on seamounts", in *Seamounts: Ecology, Fisheries, and Conservation*, T. J. Pitcher, et al., eds., Fisheries and Aquatic Resources Series 12 (Oxford, Blackwell Publishing, 2007).

[14] See A. H. Andrews, et al., "Investigations of age and growth for three deep-sea corals from Davidson Seamount off central California", in *Cold-Water Corals and Ecosystems* (Berin/Heidelberg Springer-Verlag, 2005).

Pacific, and Indian Ocean have been investigated.[15] Many of the mapped areas were fished historically or constitute potential bottom fishing areas.

18. Coral polyps, gardens and reefs of the above-mentioned taxa are vulnerable because they are erect, fragile and slow to recover, especially in the deep-sea. Bottom-touching fishing gear and other activities on the seabed within coral areas cause physical disturbance and damage. The vulnerability of corals to other impacts, such as changes in ocean acidity and temperature, is also of increasing concern.[16]

4. Other vulnerable marine ecosystems

19. Carbonate mounds often have associated fragile species, such as coral. Sponge fields consist of either very fragile erect species (e.g., glass sponges) or masses of heavy robust species such as those of the genus *Geodia*.

20. In some regions, such as the North Atlantic, significant mapping exercises have enhanced the knowledge of distribution areas of these features and species in recent years.

21. As in coral areas, studies are under way that should provide more information on the significance of these VMEs as fish habitats and on the vulnerability of relevant species and communities.

B. Deep-sea fish stocks

22. Deep-sea fish are generally defined as the diverse assemblage of fish species living beyond marginal seas and continental shelves, and/or at depths greater than 200 metres, although other depth-boundaries have also been used.[17] Major habitats are upper continental slopes, ridges, deep island and seamount slopes and summits and deep bank areas, but deep fjords and shelf troughs and canyons are also included.

23. Deep-sea fish "stocks" comprise the subset of deep-sea fishes that are targets or by-catches in commercial fisheries.[18] Few of these fishes are truly midwater (pelagic) species. Most are demersal, or live on or in association with the seabed, but some may feed benthopelagically. Most deep-sea fish stocks are exploited in waters shallower than 1,000 metres, although some are exploited to 2,000 metres. In the light of the generally steep decline in abundance and biomass and changes in species composition with increasing depth,[17] deeper fishing is unlikely to develop even if technically possible.

---

[15] See J. M. Portela, et al., "Preliminary description of the overlap between squid fisheries and VMEs on the high seas of the Patagonian Shelf", in *Fisheries Research*, vol. 16 (2010); and F. J. Murillo, et al., "Distribution of deep-water corals of the Flemish Cap, Flemish Pass, and the Grand Banks of Newfoundland (Northwest Atlantic Ocean): interaction with fishing activities", in *ICES Journal of Marine Science*, vol. 68, No. 2 (2011).

[16] See A. Freiwald and J. Murray Roberts, *Cold-Water Corals: The Biology and Geology of Deep-Sea Coral Habitats* (United Kingdom, Cambridge University Press, 2009); and A. D. Roberts, et al., "Corals on seamounts", in *Seamounts: Ecology, Fisheries and Conservation*, in Fisheries and Aquatic Resources Series 12, T. J. Pitcher, et al., eds. (Oxford, Blackwell Publishing, 2007).

[17] See N. R. Merrett and R. L. Haedrich, *Deep-sea demersal fish and fisheries* (London, Chapman and Hall, 1997).

[18] See Bensch, et al., "Worldwide review of bottom fisheries in the high seas, FAO Fisheries and Aquaculture Technical Paper 522" (2008).

24. The diversity of life history characteristics and ecology among deep-sea species is considerable. Fishes inhabiting areas shallower than 500 metres and mesopelagic or benthopelagic species, such as blue whiting and walley pollock, generally have life-history characters similar to continental shelf species.[19] But this depth limitation is not universally applicable. Deep-living species may also occur in certain shallow parts of their ranges or, for example, at summits of seamounts.

25. Longevity and growth rates also vary among deep-living species. In the North-East Atlantic, some deepwater species (e.g., alfonsino, blackspot seabream, black scabbardfish, ling, tusk) have life histories similar to shallow-living demersal species, while others (e.g., roundnose grenadier, deepwater sharks, and orange roughy) have extreme longevities spanning several decades or more than a century.[20] Deepwater sharks have very limited fecundities.

26. Most deep-sea species have very wide ranges, but regional and local spatial distribution varies between species. Some species are typically aggregating and may occur in vast concentrations (e.g., on top of seamounts)[21] and in slope sections. Some species aggregate during spawning season and are otherwise widely dispersed. Most demersal species also depend on midwater organism as prey, and take advantage of diel vertical migrations of prey species, sinking of carcasses, and circulation-dependent concentration of prey at certain depths and habitats. In addition, many species use structured habitats of geological or biogenic origin as shelter and feeding areas. Most fish species found in areas with corals and sponges also inhabit other structured habitats.

27. The deepwater fish species most vulnerable to overfishing are the easily marketable species with extended life cycles, low fecundity, slow growth and distribution areas comparatively close to markets (e.g., orange roughy, roundnose grenadier, blue ling and many deepwater sharks). Those species forming aggregations that can be readily detected and captured or showing a strong tendency to be attracted to longline bait share characteristics that enhance vulnerability.

C. Impacts of bottom fishing on vulnerable marine ecosystems and deep-sea fish stocks

28. The following section updates earlier information on the impacts of bottom fishing activities on VMEs and deep-sea fish stocks and efforts to improve their assessment.[22]

1. Vulnerable marine ecosystems

29. Several studies have documented the negative effects of mobile fishing gear on deep-sea benthic organisms and communities, in particular on structure-forming

---

[19] See M. P. Sissenwine and P. M. Mace, "Can deep water fisheries be managed sustainably?". In FAO Fisheries Report No. 838 (2007).

[20] See P. A. Large, et al., "Deep-water Fisheries of the Northeast Atlantic: II. Assessment and Management Approaches", in *Journal of Northwest Atlantic Fishery Science*, vol. 31 (2003).

[21] T. Morato and M. R. Clark, "Seamount fishes: ecology and life histories" in *Seamounts: Ecology, Fisheries and Conservation*, Fisheries and Aquatic Resources Series 12 (Oxford, Blackwell Publishing, 2007).

[22] See A/59/62/Add.1, A/61/154 and A/64/305.

organisms, such as certain corals and sponges. Impacts include localized depletion, loss of habitat complexity, shifts in community structure and changes in ecosystem processes.

30. Damage to corals appears to be lasting and recovery can take decades or even longer. Major coral reefs impacted by bottom fishing activities have likely already been lost forever.[23] Fishing in coral and sponge grounds can also result in severe unwanted by-catches with associated damage to the intended catch and interruptions to already expensive fishing operations. However, the worldwide scale of these impacts has not been satisfactorily assessed. In areas where the overall bottom trawling activity has been less, or where vessels have made efforts to avoid known coral and sponge areas, VMEs are less affected or intact even if fishing activity is heavy nearby.

31. Mapping activity has increased in recent years in many actual and potential fishing areas of the Atlantic, the Pacific and the Indian Oceans and has resulted in enhanced documentation of the existence and distribution of VME indicators. The spatial distribution of fishing activity has also been better documented and the scientific basis for management decisions has improved.[24] Habitat suitability modelling has been used to predict sub-areas of the ocean, in particular seamounts and ridges that are likely to have VME indicators at risk of fisheries impacts.[25] With sufficient calibration of model predictions with observational data on distribution of VME indicators at regional and local scales, such modelling will guide efforts to map and protect VMEs.

32. A shortcoming in previous assessments lies in the incomplete record of activity and impacts from fisheries that began in the 1960s and were largely unregulated for several decades. In most cases, records only comprise landings and the geo-referencing of landings, and information on gears and fishing effort were unsatisfactory. The trends over time in the potential for adverse impacts are not well known. Even for recent decades, it has been difficult to review the history of deep-sea fisheries and other impacts.[26]

2. Deep-sea fish stocks

33. The history of deepwater fisheries has been regarded as relatively recent. However, smaller scale fisheries deeper than 200 metres occurred well before the mid-1960s, including high-seas longlining operations for species such as ling, tusk and halibut, and artisanal fisheries for species such as black scabbardfish. However,

---

[23] See A. Williams, et al., "Seamount megabenthic assemblages fail to recover from bottom trawling impacts", in *Marine Ecology*, vol. 31 (Suppl.1) (2010).

[24] See J. Hall-Spencer, et al., "Design of Marine Protected Areas on high seas and territorial waters of Rockall Bank", in *Marine Ecology Progress Series*, vol. 397 (2009).

[25] See D. P. Tittensor, et al., "Predicting global habitat suitability for stony corals on seamounts", in *Journal of Biogeography*, vol. 36 (2009); M. R. Clark and D. P. Tittensor, "An index to assess the risk to stony corals from bottom trawling on seamounts", in *Marine Ecology*, vol. 31 (Suppl.1) (2010).

[26] A study that attempted a quantitative analysis for 2005 on a portion of the North-East Atlantic slope indicated that the relative contribution of fisheries to the overall human activity on the deep-seafloor could be high and apparently dominant. The study quantified activity, however, not impacts, and impact studies at similar spatial scales appear not to have been conducted (see A. Benn, et al., "Human activities on the deep-seafloor in the North East Atlantic: An assessment of spatial extent", in *PlosOne*, vol. 5, No. 9 (2010).

large-scale industrialized operations were more recent and expanded in a period of exploration and discovery, technological innovation, market demand, and political support through fishing subsidies. Aggregating deepwater species detected with echosounders were easy targets and excessive fishing effort led to serial depletion of localized concentrations, both on seamounts and continental slopes.[27]

34. In the 1990s, alarming observations of very rapid drops in catch per unit of effort of key target species, such as orange roughy, armourhead, roundnose grenadier, and blue ling were reported.[28] Lack of time-series data prevented scientific advisory bodies from providing precise advice, only strong warning messages. Stock assessments were not available or could not be accomplished owing to lack of data.

35. The present situation has improved, mainly because time series of catch per unit of effort and fisheries-independent research surveys have accumulated new relevant information. These activities have usually not resulted in stock assessments of satisfactory quality, but the basis for monitoring of trends and assessing status has improved. In some areas, new assessments have confirmed previous abundance trends (i.e., rapid or gradual declines in abundance to much reduced levels). In at least one case, assessments and survey data suggested no particular trend or even increasing abundance.[29] However, the survey of available cases shows that very few assessments have been made.

36. Throughout the history of large-scale fisheries, the estimate of the worldwide landed biomass of deepwater fishes from seamounts, continental slopes and ridges was approximately 2.25 million tons.[30] FAO estimated that the annual landings of deepwater species in 2006 from areas beyond national jurisdiction were approximately 250,000 tons and the number of vessels engaged in high seas deepwater fishing that year was 285.[31] Although imprecise, these figures illustrate the scale of deepwater fishing.

37. The relatively few available time series of fisheries-independent survey data show the decline in abundance in exploited deepwater fishing areas where large-

[27] The history, geographical pattern and species composition of deepwater fisheries, as well as the response of science and management, have been addressed in recent FAO reports and published papers and reviews. See, for example, FAO Fisheries Proceedings 3/1 and 3/2, Deep-sea 2003: Conference on the Governance and Management of Deep-sea Fisheries. FAO Fisheries Report No. 838 (FAO, Rome, 2005).

[28] See M. Clark, "Experience with management of orange roughy (*Hoplostethus atlanticus*) in New Zealand waters, and the effects of commercial fishing on stock over the period 1980-1993", in *Deep-water Fisheries of the North Atlantic Slope*, A. G. Hooper, ed. (Netherlands, Kluwer Academic Publishers, 1995); and ICES, Report of the Working Group on the Biology and Assessment of Deep-Sea Fisheries Resources and advisory reports 1998 and onwards. Available at www.ices.dk.

[29] See F. Gonzalez-Costas and H. Murua, "An analytical assessment of the roughead grenadier stock in NAFO Subareas 2 and 3", in *American Fisheries Society Symposium*, vol. 63 (2008).

[30] See M. R. Clark, et al., "Large-scale distant-water trawl fisheries on seamounts", in *Seamounts: Ecology, Fisheries and Conservation*, Fisheries and Aquatic Resources Series 12, T. J. Pitcher, et al., eds. (Oxford, Blackwell Publishing, 2007).

[31] See Bensch, et al., "Worldwide review of bottom fisheries in the high seas", in FAO Fisheries and Aquaculture Technical Paper 522 (2008).

scale trawling has occurred (e.g., North-West and North-East Atlantic),[32] and some impacts seem to extend deeper than the actual fishing area. Target species and associated by-catch species have been affected, but results also show that diversity and fundamental community structure has been maintained. Monitoring by regular surveys has now been conducted in many traditional deepwater fishing areas on continental slopes and some seamount areas, but recovery of depleted fish populations will take a long time.

38. The impact on certain fish stocks and by-catch species of large-scale fishing is thus well documented, and the sustainability of such fisheries has been questioned.[33] Analyses suggest that the likelihood of achieving sustainability is probably higher in small-scale fisheries.[34] Overall, the key to achieving sustainability does not lie in the fishing method and vessel size or power, but in the level of fishing mortality exerted by any fishery on the population being exploited and how well exploitation has been tuned to natural dynamics.

39. An emerging challenge is to assess changes in impact patterns on fish stocks and biodiversity as the awareness of the negative consequences of harmful fishing practices has risen during the past 10 to 15 years.[35] Analyses of changes in impact patterns and monitoring of recovery processes are also few in number.[36]

III. Actions taken by States and regional fisheries management organizations and arrangements to address the impacts of bottom fisheries on vulnerable marine ecosystems and the long-term sustainability of deep-sea fish stocks

40. In paragraph 119 of resolution 64/72, the General Assembly considered that further actions were needed to strengthen the implementation of paragraphs 80 and 83 to 87 of resolution 61/105,[37] and called upon RFMO/As, States participating in negotiations to establish RFMO/As and flag States to take a number of urgent actions in areas beyond national jurisdiction to address the impacts of bottom

[32] See J. A. Devine, et al., "Deep-sea fishes qualify as endangered", in *Nature*, vol. 439 (2006); D. M. Bailey, et al., "Long-term changes in deep-water fish populations in the North East Atlantic: deeper-reaching effect of fisheries?", in *Proceedings of the Royal Society of London, Series B*, vol. 276 (2009); N. Campbell, et al., "Species richness, taxonomic diversity, and taxonomic distinctness of the deep-water demersal fish community on the Northeast Atlantic continental slope", in *International Journal of Marine Science*, vol. 68, No. 2 (2011).

[33] See FAO Fisheries Report No. 838; T. Morato and M. R. Clark, "Seamount fishes: ecology and life histories", in *Seamounts: Ecology, Fisheries and Conservation*, T. J. Pitcher, et al., eds., Fisheries and Aquatic Resources Series 12 (Oxford, Blackwell Publishing, 2007).

[34] See H. da Silva and M. R. Pinho, "Small-scale fishing on seamounts", in *Seamounts: Ecology, Fisheries and Conservation*, T. J. Pitcher, et al., eds., Fisheries and Aquatic Resources Series 12 (Oxford, Blackwell Publishing, 2007).

[35] See O. A. Bergstad and Å. S. Høines, "Bottom fisheries closures introduced by Atlantic RFMOs as elements of new regulatory frameworks to facilitate sustainable resource utilization and conserve biodiversity. Working Document", ICES (February 2011).

[36] See Food and Agriculture Organization of the United Nations, *Report of the FAO Workshop on the Implementation of the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas: Challenges and Ways Forward, Busan, Republic of Korea, 10-12 May 2010*, FAO Fisheries and Aquaculture Report, No. 948 (FAO, Rome, 2010).

[37] See A/64/305, para. 44.

fisheries on VMEs and the long-term sustainability of deep-sea fish stocks. In paragraph 120 of resolution 64/72, the Assembly called upon flag States, members of RFMO/As and States participating in negotiations to establish RFMO/As to adopt and implement measures in accordance with paragraphs 83, 85 and 86 of resolution 61/105, paragraph 119 of resolution 64/72, and international law, and consistent with the FAO Guidelines, and not to authorize bottom fishing activities until such measures have been adopted and implemented. Furthermore, in paragraphs 122 and 123 of resolution 64/72, the Assembly called upon States and competent RFMO/As to take a number of actions to enhance efforts in cooperating to collect and exchange scientific and technical data and information and in developing or strengthening data-collection standards, procedures and protocols and research programmes.

41. States and RFMO/As have taken a wide range of actions to give effect to the relevant paragraphs of resolutions 61/105 and 64/72 in order to address the impacts of bottom fishing on VMEs and the long-term sustainability of deep-sea fish stocks.

A. Actions taken by regional fisheries management organizations and arrangements with competence to regulate bottom fisheries

42. The following section describes actions taken by RFMO/As with competence to regulate bottom fisheries, since the adoption of resolution 64/72, to give effect to paragraph 83 of resolution 61/105 and paragraph 119 of resolution 64/72 and address the impacts of bottom fishing on VMEs and the long-term sustainability of deep-sea fish stocks. These RFMO/As are the following: Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), General Fisheries Commission for the Mediterranean (GFCM), Northwest Atlantic Fisheries Organization (NAFO), North East Atlantic Fisheries Commission (NEAFC), and South East Atlantic Fisheries Organization (SEAFO).[38]

43. Other RFMO/As, such as Central Asian and Caucasus Regional Fisheries and Aquaculture Commission (CACFish), Commission for the Conservation of Southern Bluefin Tuna (CCSBT), and Western and Central Pacific Fisheries Commission (WCPFC), reported that they either did not regulate bottom fisheries or did not have the mandate to do so. Contributions received from the North Atlantic Salmon Conservation Organization (NASCO) and the Pacific Island Forum Fisheries Agency (FFA) described general efforts and activities to sustainably manage fish stocks and protect vulnerable marine ecosystems.

1. Overview of recent actions taken by RFMO/As

44. In CCAMLR, the current management strategy to avoid significant adverse impacts on VMEs consists of the following measures: (i) a ban on bottom trawling in the high-seas areas of the CCAMLR Convention Area; (ii) restriction of exploratory fishing for toothfish to areas deeper than 550 metres; (iii) closure of risk areas around by-catch of VME indicator taxa when greater than a threshold level; and (iv) notification of areas with evidence of VMEs to be included on a VME register. The most important conservation measures that have been adopted to

[38] Actions taken to implement para. 119 of resolution 64/72 by States participating in negotiations to establish RFMO/As are described in sect. III.B (2).

support the sustainable management and conservation of marine living resources are conservation measure 22-06 (Bottom fishing in the Convention Area) and conservation measure 22-07 (Bottom fishing activities subject to conservation measure 22-06).[39]

45. Recent measures in GFCM included reducing bottom trawling fishing effort by a minimum of 10 per cent in the GFCM Area, establishing a fisheries restricted area in the Gulf of Lions to protect spawning aggregations and deep-sea sensitive habitats, and adopting a 40 millimetre (mm) square mesh as a minimum size for the codend of demersal trawlers.

46. NAFO recently approved delineation of its existing bottom fishing based on data collected from Contracting Parties for 1987-2007. The NAFO footprint delineated areas historically open to fishing using bottom contact gears and was used by NAFO to distinguish between existing and new fishing areas. Closures introduced between 2006 and 2009 on seamounts and in areas where corals and sponges had been identified were maintained after reviews in 2010 were continued. A working group was established in the NAFO Scientific Council on ecosystem approaches to fisheries management, which had been tasked with identifying candidate VMEs and assessing the potential for significant adverse impacts. A working group of fishery managers and scientists on VMEs was also created to examine scientific advice and evaluate risks and recommend mitigating measures to avoid significant adverse impacts on VMEs in the NAFO Regulatory Area.

47. NEAFC was protecting VMEs and reducing the risk of significant adverse impacts by establishing large marine protected areas (MPAs) that were closed to bottom fisheries for conservation purposes and by regulating fishing activity in sub-areas remaining open to fishing. MPAs were established where there was scientific evidence of VMEs. In areas where scientific information was less complete, such as on the mid-Atlantic Ridge and adjacent seamounts, large representative areas were nonetheless closed to bottom fisheries. In sub-areas remaining open to fishing, bottom fishing regulations applied to fishing vessels using fishing gear likely to contact the seafloor during the normal course of fishing operations. NEAFC had also prohibited the use of gillnets and entangling nets[40] in depths below 200 metres and had introduced measures to prevent the loss of gear and cleaning up lost gear (ghost fishing) from the period before the gillnet ban.

48. In addition, NEAFC had developed maps on existing and new fishing areas in order to develop proportionate prerequisites for undertaking fishing trips with bottom gears. The maps would be revised regularly.[41] NEAFC also analysed the extent of the protection of VMEs in its regulatory area and had estimated that 91.9 per cent of the area south of Iceland had been identified as a new fishing area and therefore subject to its interim exploratory fishing protocol. MPAs had been established in 7.3 per cent of this area, which represented 54 per cent of the fishable

[39] These measures supplement conservation measures 22-04 and 22-05 on deep-sea gillnetting and the use of bottom trawling gear for purposes other than scientific research; 24-01 on the application of conservation measures to scientific research; 41-05 and 22-08 on prohibiting fishing with bottom gear below 550 metres; 21-01 on new fisheries measures; 21-02 on exploratory fisheries; and 10-02 on authorizing bottom fishing activities and the procedures in 22-06.

[40] See A/64/305, para. 35.

[41] Contribution of the European Union.

area south of Iceland (less than 2,000 metres in depth). The whole of the Arctic Ocean had also been identified as a new fishing area.[42]

49. Recent measures adopted in SEAFO to address the protection of VMEs included conservation measure 18/10 on the management of vulnerable deep water habitats and ecosystems. Pursuant to this measure, a total of 11 sub-areas known or likely to contain VMEs had been closed to bottom fisheries activities. Conservation measure 17/09 on bottom fishing activities in the SEAFO Convention Area applied to all existing and new bottom fishing areas outside SEAFO closed areas and contained detailed provisions on encounters with VMEs.

2. Measures taken by RFMO/As to implement paragraph 83 of resolution 61/105 and paragraph 119 of resolution 64/72

50. In paragraph 83 of resolution 61/105, the General Assembly called upon RFMO/As with the competence to regulate bottom fisheries to adopt and implement measures, in accordance with the precautionary approach, ecosystem approaches and international law, as a matter of priority, but not later than 31 December 2008, to regulate bottom fishing activities and protect VMEs. In paragraph 119 of resolution 64/72, the Assembly considered that further actions were needed to strengthen the implementation of the relevant paragraphs of resolution 61/105 and called upon RFMO/As, States participating in negotiations to establish RFMO/As and flag States to take a number of urgent actions in areas beyond national jurisdiction.

51. The following section describes actions taken by RFMO/As to give effect to paragraph 83 of resolution 61/105 and paragraph 119 of resolution 64/72.[38]

(a) Conducting assessments and ensuring vessels do not engage in bottom fishing until assessments have been carried out

52. In paragraph 83 (a) of resolution 61/105, the General Assembly called upon RFMO/As to assess, on the basis of the best available scientific information, whether individual bottom fishing activities would have significant adverse impacts on VMEs, and to ensure that activities that would have significant adverse impacts on these ecosystems were managed to prevent such impacts, or not authorized to proceed. In paragraph 119 (a) of resolution 64/72, the Assembly also called upon RFMO/As to conduct the assessments called for in paragraph 83 (a) of resolution 61/105, consistent with the FAO Guidelines, and ensure that vessels do not engage in bottom fishing until such assessments have been carried out.

53. In CCAMLR, conservation measures 22-06 and 22-07 provided for an assessment process to be undertaken by the CCAMLR Scientific Committee to determine if bottom fishing activities, taking into account, inter alia, the history of bottom fishing in the area and a risk assessment, would contribute to significant adverse impacts on VMEs, and to ensure that, if it was determined that the activities would make such contributions, they were managed to prevent such impacts or were not authorized to proceed. The impact assessment framework was designed as a flexible framework within which to estimate total impacts across all bottom fishing methods, to inform comparison between impacts occurring in different areas from

[42] ICES had designed a complete Exploratory Bottom Fisheries Protocol, which would be reviewed by NEAFC in 2011.

different fisheries and/or arising from different fishing methods. In 2010, CCAMLR further refined the format and requirements for preliminary impact assessments of bottom fishing activities that members were required to submit prior to fishing.[43]

54. Nine CCAMLR members had submitted notifications to participate in new and exploratory fisheries under conservation measure 21-02 and had submitted preliminary benthic impact assessments as required under conservation measure 22-06. CCAMLR members had been requested to complete method assessments for Spanish longlines, trotlines, pots and bottom trawls, so that an impact assessment could be completed. Estimated impacts from longlines were generally low, and fishing effort was distributed unevenly within the fished areas of each sub-area or division. Work had yet to be undertaken on using the impact assessment methods to determine the impacts of proposed bottom fishing activities in the future.

55. In NAFO, as of 1 January 2009, all bottom fishing activities in new fishing areas or with bottom gear not previously used in the area concerned were considered to be exploratory fisheries and subject to its exploratory fisheries protocol, as well as an assessment procedure. The NAFO exploratory fishery protocol described the responsibilities of NAFO Contracting Parties to notify the NAFO secretariat of their intent to fish and provide harvesting, mitigation, catch monitoring and data-collection plans.

56. The assessment procedure was further elaborated in 2010 and required all future assessments of bottom fishing activities to conform to the relevant elements of the FAO Guidelines, including ensuring compatibility across flag States' assessments.[44] Contracting Parties were required to submit information and a preliminary assessment of the known and anticipated impacts of bottom fishing activities on VMEs if bottom fishing was proposed outside the existing footprint; if there were significant changes to the conduct or technology of existing bottom fisheries; or if new scientific information indicated a VME in a given area.

57. In 2010, the NAFO Scientific Council reviewed the potential for significant adverse impacts of pelagic, long-line and other fishing gear types other than mobile bottom gear on seamount VMEs and concluded that there was a clear potential for fishing gears other than bottom trawling to produce significant adverse impacts on VME communities. Impacts were typically associated with (a) habitat destruction produced by the gear when in contact with the bottom; and (b) depletion of localized populations of both non-commercial VME species indicators and commercial valuable local fish stocks. Movements caused when longlines, gillnets and traps were being deployed and recovered could also damage benthic structures and habitats. Given the slow growth/reproductive rates that characterize VME-forming species, these damages could accrue to constitute significant adverse impacts.

58. In NEAFC, all bottom fishing activities in new bottom-fishing areas or with bottom gear not previously used in the area concerned had been considered to be exploratory fisheries since 2009 and subject to an exploratory bottom fisheries protocol and an assessment procedure. Contracting Parties proposing to participate in bottom fishing were required to submit information on and, where possible, an initial assessment of the known and anticipated impacts of their bottom fishing activities on VMEs, including proposed mitigation measures to prevent such

[43] Contributions of the European Union and the United States.

[44] Contributions of NAFO and the United States.

impacts. Thereafter, NEAFC would adopt conservation and management measures to prevent significant adverse impacts on VMEs, which could include allowing, prohibiting or restricting bottom fishing with certain gear types. In 2010, NEAFC also adopted changes in the bottom fishing regulations to clarify the obligation to perform an initial assessment before fisheries commence.[45]

59. SEAFO reported that all bottom fishing activities in new bottom fishing areas, or with bottom gear not previously used in the area, were considered to be exploratory fisheries and were subject to an interim exploratory bottom fisheries protocol. Before exploratory bottom fishing could take place, a detailed proposal was to be submitted to the SEAFO Scientific Committee, which would provide a recommendation on whether the exploratory fishing could proceed. Exploratory bottom fishing activities were also subject to an assessment by the SEAFO Scientific Committee, based on the best available scientific information, to determine if the activities would have significant adverse impacts on VMEs. Taking account of the advice and recommendations of the SEAFO Scientific Committee, SEAFO was to adopt conservation and management measures to prevent significant adverse impacts on VMEs that could include prohibiting or restricting bottom fishing activities or bottom fishing with certain gear types.

(b) Identifying vulnerable marine ecosystems and adopting measures to prevent significant adverse impacts or closing areas to bottom fishing

60. In paragraph 83 (b) of resolution 61/105, the General Assembly called upon RFMO/As to identify VMEs and determine whether bottom fishing activities would cause significant adverse impacts to such ecosystems and the long-term sustainability of deep-sea fish stocks, inter alia, by improving scientific research and data collection and sharing, and through new and exploratory fisheries. In respect of areas where VMEs were known to occur or were likely to occur, based on the best available scientific information, RFMO/As were called upon to close such areas to bottom fishing and ensure that such activities did not proceed unless conservation and management measures had been established to prevent significant adverse impacts. In paragraph 119 (b) of resolution 64/72, the Assembly called upon RFMO/As to conduct further marine scientific research and use the best scientific and technical information available to identify where VMEs were known to occur or were likely to occur and adopt conservation and management measures to prevent significant adverse impacts on such ecosystems consistent with the FAO Guidelines, or close such areas to bottom fishing until conservation and management measures have been established, as called for in paragraph 83 (c) of resolution 61/105.

61. In giving effect to these paragraphs and conducting marine scientific research to identify VMEs, NAFO reported that Spain launched the NAFO Potential Vulnerable Marine Ecosystem-Impacts of Deep-sea Fisheries (NEREIDA) project, which was expected to delineate the location of corals and sponges in the NAFO Regulatory Area with much greater precision than had been possible to date (also see sect. III.C).[46] Canada also conducted scientific surveys and studies in 2009 to characterize the Orphan Knoll, which was a seamount closed by NAFO. Ongoing research activities were expected to generate data and produce analyses, including ongoing NEREIDA cruises focused on the identification and delineation of VMEs

[45] Contribution of Norway.

[46] Contributions of Canada, the European Union and NAFO.

and VME-defining species, the collection and identification of sponges in a 2009 Greenland demersal survey, and other research activities carried out by Canada.

62. SEAFO reported that an updated bathymetric database and map for the SEAFO Convention area had been created, based on various data-sets from a number of public sources around the world. The study suggested that data, on South Atlantic seamounts, especially in terms of biologically significant data, was at best very patchy and of variable quality. Locations of seamount and seamount complexes with depth ranges potentially explored or exploited by bottom fisheries were localized better and visualized.

63. In adopting measures to prevent significant adverse impacts or closing areas to bottom fishing, CCAMLR was developing advice on precautionary management actions that could be taken to mitigate immediate risks to VMEs, and including in its VME register two new sites identified during a fishery-independent trawl survey. Registered VMEs were protected through spatial closures of varying sizes for some areas. However, there were no general measures in place to give specific protection to all registered VMEs.

64. CCAMLR was also focusing attention on MPAs and a series of milestones had been agreed to support the submission of proposals to CCAMLR on a representative system of MPAs in 2012. In 2009, CCAMLR declared its first high seas MPA, for the South Orkney Islands southern shelf, and conservation measure 91-03 prohibited all types of fishing activities, including a prohibition on the dumping of waste and discharges by fishing vessels, in an area of approximately 94,000 square kilometres.

65. GFCM reported on the establishment of a fisheries-restricted area in the Gulf of Lions to protect spawning aggregations and deep-sea sensitive habitats, in addition to other earlier closures to protect deep-sea sensitive habitats, including deep water coral reefs, where fishing with towed dredges and bottom trawl nets was prohibited.

66. In NAFO, 18 areas in the NAFO Regulatory Area were currently closed to bottom fishing. Seamount closures were reviewed in 2010 and extended until 2014. In 2011, all current closed areas would be reviewed, as well as existing measures pertaining to bottom fishing in the NAFO Regulatory Area. The total area currently closed to bottom fishing activity was estimated to be 14.13 per cent of the total NAFO Regulatory Area.[47]

67. In 2009, NAFO published a coral identification guide to assist in identifying and recording the various species of coral likely to be commonly encountered in fishing trawls. In 2010, a sponge identification guide was also developed, which complements the coral guide and allows for easier identification of common sponge species.

68. NEAFC reported establishing MPAs where there was scientific evidence of the occurrence of VMEs. MPAs created in 2004 had been regularly updated as additional scientific advice had been received, primarily in response to requests for scientific advice from the International Council for the Exploration of the Sea (ICES). Inspection services had investigated how MPAs could be monitored and

[47] A portion of a coral and sponge protection zone closure falls outside of the NAFO Regulatory Area (in Canada's exclusive economic zone), and was thus taken into account when calculating the proportion closed to bottom fishing.

controlled and indicated that it was feasible to establish effective control and enforcement of these areas.

69. NEAFC also reported establishing large MPAs based on the general considerations of creating no take zones to preserve, protect and/or facilitate the restoration of resources and associated invertebrate communities, and to protect representative VMEs against potentially significant adverse impacts. In 2009, NEAFC decided to considerably expand closures in the Mid-Atlantic Ridge that had been closed until the end of 2008 on a precautionary basis. Historical fishing effort data or impact assessments at relevant spatial scales were not available and were unlikely to become available unless dedicated major efforts to mine historical sources were implemented. A comprehensive evaluation of the current state of the resources and their associated invertebrate communities could thus not be made.

70. SEAFO reported that a fishing footprint had been prepared based on digital catch position data for individual hauls/sets for the period 1987-2007 and historical fishing from 1996-2010 to date. Three categories of exploitable seamounts/seamount complexes were defined ("considered to be unexploited", "already slightly exploited", and "already exploited"), and the spatial pattern of fishing was overlaid on seamount areas already identified. A total of 11 sub-areas known or likely to contain VMEs had been closed to bottom fisheries activities on the basis of bathymetry and best knowledge of biogeography. The closures all contained areas potentially or actually exploitable by present fisheries ranging in depth to a maximum of approximately 2,000 metres and were distributed geographically under the assumption that a biogeographically representative set of seamounts/seamount complexes would be protected.

(c) Protocols for encounters with vulnerable marine ecosystems

71. In paragraph 83 (d) of resolution 61/105, the General Assembly called upon RFMO/As to require vessels of members to cease bottom fishing activities in areas where, in the course of fishing operations, VMEs were encountered and to report the encounter so that appropriate measures could be adopted in respect of the relevant site. In paragraph 119 (c) of resolution 64/72, the Assembly called upon RFMO/As to establish and implement appropriate protocols for the implementation of paragraph 83 (d) of resolution 61/105, including definitions of what constituted evidence of an encounter, in particular threshold levels and indicator species.

72. In CCAMLR, conservation measure 22-07 specified action required when organisms that may be indicative of the presence of a VME were encountered, including providing notifications to the CCAMLR secretariat. It also defined "Risk Area", "VME Indicator Organism", "VME Indicator Unit", and encounter parameters. The CCAMLR secretariat was responsible for maintaining a VME Taxa Classification Guide and a VME Register of known or likely VME areas protected from bottom fishing activities.[45] Conservation measure 22-06 also required Contracting Parties to provide notification to the CCAMLR secretariat in other cases, including during the course of research and related activities. The measure included guidelines specifying categories of information to be included in such notifications. The CCAMLR encounter measure will be reviewed again in 2012.[48]

[48] Contribution of New Zealand.

73. The CCAMLR Scientific Committee provided advice on known and anticipated impacts of bottom fishing activities on VMEs and recommended practices and mitigation measures, including cessation of fishing activities when evidence of a VME was encountered. Thirty-two encounters with VMEs were notified in accordance with conservation measure 22-06 during the course of research in areas that were currently closed to most bottom fishing activities. A total of 53 VME indicator notifications were submitted in accordance with conservation measure 22-07, including notifications that resulted in the declaration of 15 Risk Areas.

74. Interim encounter provisions were established in NAFO in 2008 for fishing in new and existing fishing areas when VME indicator species were encountered. In 2010, measures were adopted to implement a more comprehensive data-collection protocol for coral and sponge species encountered in exploratory and existing fishing areas.[43] The threshold amounts of primary VME indicator species were reduced to more precautionary levels, from 100 kg to 60 kg of live coral and/or from 1,000 kg to 800 kg of live sponge. Fishing vessels that were operating potentially harmful gear types and encountering evidence of VMEs were subject to stopping fishing, moving away and reporting such encounters. For exploratory fisheries in new fishing areas, a temporary closure of a two-mile radius around the reporting position would also be implemented. The information reported from such encounters was then scientifically assessed and reviewed to determine and adopt any necessary measures for the protection of VMEs.

75. In the North-East Atlantic, the NEAFC "move-on" rule applied in new and existing fishing areas. Vessels were required to cease bottom fishing activities in any site where, in the course of fishing operations, evidence of VMEs was encountered, and to report the encounter to the NEAFC Secretary so that appropriate measures could be adopted. An encounter with primary VME indicator species was defined in terms of a quantity of live corals and sponges caught in a fishing operation.[49] NEAFC indicated that there had not been any reports of encounters with VMEs and that authorization to fish in new fishing areas had not been granted by any NEAFC Contracting Party.

76. In SEAFO, conservation measure 17/09 contained a protocol and operational procedures on the landing and reporting of corals and sponges. SEAFO Contracting Parties are required to ensure that vessels flying their flag ceased bottom fishing activities where, in the course of fishing operations, evidence of VMEs was encountered and to report the encounter to the SEAFO Executive Secretary so that appropriate measures could be adopted. For both existing and new fishing areas, an encounter with primary VME indicator species was defined on a provisional basis as a catch per set (e.g., trawl tow, longline set or gillnet set) of more than 60 kg of live coral and/or 800 kg of live sponge.

77. In 2010, the SEAFO Scientific Sub-Committee analysed data on sponges and corals caught by a Spanish longline on commercial trips fishing for toothfish in the first half of 2010, but concluded that the quantities of VME indicators taxa were

[49] See "Consolidated text of all NEAFC recommendations on regulating bottom fishing", annex 4, provides as follows: "For both existing and new fishing areas, an encounter with primary VME indicator species is defined as a catch per set (e.g. trawl tow, longline set, or gillnet set) of more than 60 kg of live coral [and/or 800 kg of live sponge]." Available at http://neafc.org/system/files/%252Fhome/neafc/drupal2_files/consolidated_bottomfishing_regulations.pdf.

relatively small in most of the sets and did not exceed the threshold as set by the Commission.

(d) Measures to ensure the long-term sustainability of deep-sea fish stocks and non-target species and the rebuilding of depleted stocks

78. In paragraph 119 (d) of resolution 64/72, the General Assembly called upon RFMO/As to adopt conservation and management measures, including monitoring, control and surveillance measures, on the basis of stock assessments and the best available scientific information, to ensure the long-term sustainability of deep-sea fish stocks and non-target species and the rebuilding of depleted stocks. In this regard, where scientific information was uncertain, unreliable or inadequate, RFMO/As were to ensure that conservation and management measures were established consistent with the precautionary approach, including measures to ensure that fishing effort, fishing capacity and catch limits, as appropriate, were at levels commensurate with the long-term sustainability of such stocks.

79. CCAMLR reported that it had adopted resolution 31/XXVIII relating to the use of the best available science to support the development of conservation measures and, consistent with paragraph 119 (d) of resolution 64/72, a suite of conservation and management measures relating to monitoring, control and surveillance, regulation of mesh size, catch and effort reporting, prohibitions on directed fishing, measures for exploratory fisheries, and precautionary catch limits.

80. GFCM focused on developing and strengthening its monitoring, control and surveillance frameworks, including for deep-sea fisheries in international waters. In this regard, GFCM adopted a series of measures, including minimum standards for the establishment of a vessel monitoring system and a regional fishing vessel register. Each year, GFCM reviewed the compliance of members and cooperating non-members and requested remedial actions to address acts or omissions identified so as not to diminish the effectiveness of its management measures. The levels of overall fishing capacity in the GFCM area were determined based on a regional plan of action considering the national and regional fishing capacity management plans and scientific advice.

81. NAFO reported that it had adopted conservation and management measures for the 20 fish stocks under its mandate each year. Its comprehensive monitoring, control and surveillance scheme included vessel registry, reporting and recording requirements of catches and fishing effort, labelling of fish products, stowage requirements and marking of gear, independent observers, joint patrol and inspection schemes, vessel monitoring system and port State measures. In addition, NAFO conducted an annual compliance review to assess how NAFO Contracting Parties were complying with its conservation and enforcement measures.

82. NEAFC reported that all aspects of the management of the major fisheries in the NEAFC Regulatory Area were detailed in the NEAFC fishery status report for the years 1998-2007. All species fished in the NEAFC Regulatory Area were regulated resources and management measures were in place. For some stocks, analytic stock assessments were also available from ICES. In addition, NEAFC fishery fact sheets, including on deep-sea fisheries, were published in the FAO Fishery Resources Monitoring System. NEAFC had adopted a comprehensive framework on monitoring, surveillance and control to assist in promoting the long-term conservation and optimum utilization of the fishery resources in the North-East

Atlantic area. The NEAFC Scheme of Control and Enforcement and the Non-Contracting Party Scheme was now integrated.

83. In regards to fishing effort, NEAFC reported that since analytical assessments for many of the deep-sea fish stocks were unavailable, controlling fishing mortality for individual deep-sea stocks had been deemed not to be feasible. Instead, NEAFC had applied overall effort control, reducing effort in the limited deep-sea fisheries in areas beyond national jurisdiction by 35 per cent.

84. SEAFO adopted a variety of conservation and management measures to ensure the long-term sustainability of deep-sea fish stocks and non-target species and the rebuilding of depleted stocks, consistent with the FAO Guidelines, including measures on the conservation of target species, the conservation of VMEs, flag State responsibilities, and fishing in general. Measures adopted to ensure the sustainable utilization of deep-sea fisheries and VMEs included conservation measure 17/09, which addressed all activities related to bottom fisheries and applied in all existing and new bottom fishing areas outside SEAFO closed areas. SEAFO also maintained a record of fishing vessels authorized to conduct fishing activities. Vessels not entered into the record were considered to be conducting IUU fishing.[45]

B. Actions taken by States to regulate bottom fisheries

85. In paragraph 80 of resolution 61/105 and paragraph 113 of resolution 64/72, the General Assembly called upon States to take action immediately, individually and through RFMO/As, and consistent with the precautionary approach and ecosystem approaches, to sustainably manage fish stocks and protect VMEs from destructive fishing practices, recognizing the immense importance and value of deep-sea ecosystems and the biodiversity they contain. In particular, in paragraph 113 of resolution 64/72, the Assembly emphasized the need for States to take action to implement the FAO Guidelines in this regard.

86. In paragraph 119 of resolution 64/72, the General Assembly called upon flag States to take a number of urgent actions in areas beyond national jurisdiction to address the impacts of bottom fisheries on VMEs and the long-term sustainability of deep-sea fish stocks. In addition, in paragraph 120 of resolution 64/72, the General Assembly called upon flag States and members of RFMO/As to adopt and implement measures in accordance with paragraphs 83, 85 and 86 of resolution 61/105, paragraph 119 of resolution 64/72, and international law, and consistent with the FAO Guidelines, and not to authorize bottom fishing activities until such measures have been adopted and implemented.

87. The following section describes the wide range of measures and actions taken by States to give effect to resolutions 61/105 and 64/72 to address the impacts of bottom fisheries on VMEs and the long-term sustainability of deep-sea fish stocks.

1. Overview of actions taken by States

88. States and the European Union reported that the effects of destructive fishing practices on VMEs were a serious problem and that resolutions 61/105 and 64/72, as well as the FAO Guidelines, were indispensable tools in the protection of VMEs from significant adverse impacts caused by destructive fishing practices and in ensuring the long-term sustainability of deep-sea fish stocks (Canada, Norway,

United States). Resolution 61/105 was considered to be a watershed moment in the history of high seas fisheries and a regime shift for fisheries management.

89. Some States and the European Union emphasized the importance of the implementation of the FAO Guidelines and highlighted their individual and collective efforts in this regard (Australia, Canada, Norway, United States). A few States also highlighted the special circumstances and challenges faced by developing States in giving full effect to the FAO Guidelines and resolutions 61/105 and 64/72 (New Zealand, United States). New Zealand was particularly committed to supporting small island developing States in the Pacific. The United States had collaborated with New Zealand to identify VMEs in the South Pacific.

90. Several States (Australia, Canada, Croatia, Mexico, Norway, United States) and the European Union also reported on progress in the application of precautionary and ecosystems approaches to protect VMEs from bottom fishing and destructive fishing practices. Canada developed a policy for managing the impacts of fishing on sensitive benthic areas that applied to all commercial, recreational and aboriginal marine fishing activities within and beyond areas under national jurisdiction. Separate processes were outlined for historically fished and frontier areas, and required greater precaution when fishing was being considered in frontier areas. Special consideration was given to historically fished areas that had not been exposed to bottom-contact fishing by requiring prior risk assessments. In the United States, a national policy was established to ensure the protection, maintenance, and restoration of the health of ocean, coastal, and Great Lakes ecosystems and resources, which had at its heart an ecosystem-based coastal and marine spatial planning framework.

91. Some States and the European Union also reported on the development of comprehensive legislations or national policies to regulate bottom fishing and address impacts on VMEs (Canada, Chile, Denmark, Norway, United States). Chile was developing a draft law to establish a legal framework for the protection and preservation of VMEs. Denmark reported that Greenland was developing legislation to restrict bottom touching gear by defining new fishing areas, establishing a move away clause in new fishing areas, reporting obligations in areas outside new fishing areas, and identifying new areas where fishing with bottom touching gear was not allowed.

92. The European Union reported that the reform of its common fisheries policy was ongoing and was expected to be adopted by the end of 2012, and enter into force on 1 January 2013. The policy established the legal framework for the conservation, management and exploitation of living aquatic resources where such activities were practised on the territory of European Union member States or in European Union waters or by European Union fishing vessels, including the application of the precautionary and ecosystem approaches to fisheries management.

93. Norway reported that it was developing national regulations on bottom fishing activities, expected to enter into force later in 2011, aimed at protecting VMEs from destructive fishing practices. More rigorous obligations, including with regard to reporting and protocol routines, as well as scientific observers, would apply for fishing activities in new bottom fishing areas. In the case of an encounter with a VME, vessels would be required to cease fishing, report the incident and move at least two nautical miles away from the area.

94. Several States and the European Union also reported on a variety of research and monitoring activities within areas of national jurisdiction to determine the status of fish stocks, identify or map VMEs, or increase knowledge on marine ecosystems (Australia, Bulgaria, Canada, Chile, Croatia, Mexico, Norway, United States). In addition, some States and the European Union reported on research programmes to assess the impacts of bottom fishing on fish stocks and marine ecosystems within areas of national jurisdiction (Canada, Chile, Croatia, United States). In the United States, a spatially explicit model was being developed as a tool for identifying habitat types and locations that were more vulnerable to fishing with different commercial gear types. The model could be used to track area-specific temporal changes in fishing effort and to identify areas that were most heavily impacted and in need of management. It could also be used to predict how certain gear modifications or reductions in fishing effort could affect habitat impacts.

(a) Measures to regulate bottom fishing vessels or close areas to bottom fishing

95. Many States and the European Union provided information on measures taken to regulate bottom fishing within areas of national jurisdiction (Bulgaria, Canada, Chile, Colombia, Croatia, Denmark, France, Iceland, Italy, Mexico, United States). The measures included restrictions or prohibitions on bottom fishing gear or activities (Bulgaria, Canada, Colombia, Croatia, Denmark, Iceland, Mexico, United States), spatial, temporal or effort restrictions (Bulgaria, Canada, Chile, Croatia, Denmark, Iceland, Italy, Mexico, Norway, Palau, United States), as well as monitoring, surveillance and control of vessels. In this regard, Palau banned all bottom trawling in areas under its national jurisdiction and all bottom trawling by its nationals and vessels anywhere in the world. Palauan law also prohibited companies doing business in Palau from engaging in bottom trawling anywhere in the world (see also sect. III.B.3 (b)). Several States also highlighted measures taken to ensure the long-term sustainability of deep-sea fish stocks and non-target species, and the rebuilding of depleted stocks, consistent with the FAO Guidelines, as called for in paragraph 119 (d) of resolution 64/72 (Australia, New Zealand, United States).

96. A number of States reported on the use of area-based management tools within areas of national jurisdiction to protect VMEs and marine biodiversity more generally, by limiting or restricting fishing activities, including through the establishment of marine parks, marine conservation areas, MPAs and no-take zones (Canada, Chile, Colombia, Croatia, Mexico, Iceland, United States). Many States also reported on a variety of specific closures within areas of national jurisdiction to prohibit bottom fishing activities and protect VMEs from significant adverse impacts (Bulgaria, Canada, Chile, Colombia, Croatia, Denmark, Iceland, Italy, Mexico, Norway, Palau, United States).

97. For example, in Canada, the offshore trawling industry for shrimp and groundfish had instituted a voluntary closure off Nova Scotia to protect a concentration of rare sponges. Chile recently established the Motu Motiro Hiva Marine Park, encompassing a surface area of 150,000 square kilometres, which was off limits to any type of commercial extractive activity. In Croatia, fishing activities were banned in 20 nursery areas and some forms of commercial fishing were prohibited in larger parts of its territorial waters. Denmark, in respect of Faroe Islands, reported that three areas where coral reefs had been identified were closed to all trawling and additional areas were being mapped. Most of the Faroe Bank was also permanently closed to bottom trawling. Iceland reported that the use of bottom

fishing trawl was totally prohibited in certain coastal waters, often with a high proportion of juvenile fish. Approximately 59,000 km² of a total area of 212,000 km² less than 500 metres in depth was thus excluded from bottom trawling.

98. Mexico's national legislation set out specifications for fishing that governed programmes for 40 protected natural areas, as well as guidelines for the protection of 15 marine species that were not subject to fishing exploitation. The Guaymas Basin and Eastern Pacific Rise Hydrothermal Vents Sanctuary was established in 2009 and covered a total surface area of 1,456 km² in which fishing was prohibited.

99. In the United States, trawling was prohibited in several areas of Alaska to protect red tree corals, sensitive benthic habitats used by crabs and other species, and pinnacles that have vulnerable ecosystems similar to seamounts. In the South Atlantic, deepwater MPAs were established to shield deep-water fish species and their habitats from fishing.

100. Some States also reported on specific strategies or closures to protect cold water corals and sponge communities within areas of national jurisdiction (Canada, Iceland, Norway, United States). In Iceland, five coral areas had been closed and further work was aimed at defining areas that needed special protection, as well as proposals for additional areas to be closed for all bottom contacting fishing gears. In Norway, regulations were adopted to protect cold-water coral reefs, which provided that intentional and negligent destruction of known coral reefs was prohibited and precaution was required when fishing in the vicinity of known cold-water coral reefs and eight particularly valuable coral reefs had been granted special protection. There was a general duty of care for Norwegian vessels during fishing operations near known coral reefs, which applied to waters under Norwegian fisheries jurisdiction and outside for vessels flying the Norwegian flag.

101. In the United States, new deepwater coral habitat areas of particular concern and gear prohibitions were established in areas of the South Atlantic to reduce or eliminate the impacts of fishing on cold-water coral and sponge habitats, encompassing an area over 62,000 km² where bottom tending fishing gear and anchoring by fishing vessels were prohibited. Canada and the United States also reported on the development of strategic plans for coral and sponge ecosystems.

(b) Implementation by States of measures adopted by competent RFMO/As

102. Many States supported the adoption of measures in RFMO/As in which they were members to protect VMEs from the impact of bottom fishing activities, pursuant to resolutions 61/105 and 64/72. In this context, States reported that existing RFMO/As had taken significant actions to implement resolution 61/105, although further work was necessary, both through existing RFMO/As and those under development, to identify and protect VMEs from significant adverse impacts of bottom fishing activities and to sustainably manage deep-sea fisheries.

103. More specifically, States reported on a variety of actions they had taken to support or implement conservation and management measures in RFMO/As to which they belonged to regulate deep-sea fishing and protect VMEs. Such actions were reported, in particular, in CCAMLR (Australia, Chile, European Union, France, Norway, New Zealand, United States), GFCM (Croatia), NAFO (Canada, France, European Union, Iceland, Norway, United States), NEAFC (Iceland, Norway) and SEAFO (European Union).

104. Many States and the European Union also provided information on actions that had been taken nationally to implement conservation and management measures adopted in RFMO/As to address the impacts of bottom fishing on VMEs (Australia, Canada, Chile, Croatia, Denmark, Iceland, New Zealand, Norway, Republic of Korea, United States). Denmark, in respect of the Faroe Islands, emphasized that time was needed to gain practical experience from the implementation of new provisions for bottom fisheries in the high seas and there was also a need to take due account of the knowledge and skills of vessel operators with experience from deep-sea bottom fisheries in the design and implementation of regulatory measures.

105. Some States and the European Union also reported on the adoption of measures to ensure that vessels entitled to fly their flag complied with conservation and management measures adopted by RFMO/As (Australia, Chile, Croatia, Republic of Korea). Other States indicated that their vessels did not engage or were not authorized to conduct bottom fisheries in areas beyond national jurisdiction, or that their vessels did not fish outside areas regulated by RFMO/As (Chile, Croatia, Colombia, Denmark, France, Germany, Kuwait, Mexico, New Zealand, United States) (see sect. III.B.3 (b)).

106. Australia applied strong controls over vessels flying its flag through the issuance of high seas fishing permits to ensure compliance with conservation and management measures adopted by RFMO/As. All Australian flagged vessels were required to hold a high seas permit before undertaking any fishing activity and were subject to a number of measures, including mandatory observer coverage, move-on provisions, restrictions on fishing methods and gear types, seabird by-catch reduction measures in line fisheries, requirements to avoid interactions with cetaceans and other protected species, species catch prohibitions and vessel monitoring systems and reporting requirements. On encountering evidence of a VME, Australian vessels were required to cease fishing within a five-nautical-mile radius and provide details to its authorities so that appropriate measures could be adopted. The location was then closed to all operators using that gear type for the life of the permit, which was normally 12 months (see sect. III.B.2 (b) and (c)).

107. Croatia applied a strict licensing regime for fisheries activities within the areas covered by the International Commission for the Conservation of Atlantic Tunas (ICCAT) and GFCM and undertook all measures to strictly monitor its fleet using satellite tracking devices both in waters under national jurisdiction and on the high seas. France, in respect of its overseas territories, indicated that any new bottom fishing activities were to be submitted for preliminary authorization and that preliminary impact assessment measures would be imposed, pursuant to resolutions 61/105 and 64/72.

108. New Zealand undertook pre- and post-trip inspections of vessels entering the CCAMLR Convention Area to ensure operators adhered to the relevant conservation measures. Otherwise, flagged vessels did not have permission to conduct bottom fishing on the high seas outside of the CCAMLR and SPRFMO areas.

109. Several States and the European Union also reported on research activities and the work of scientific working groups in existing RFMO/As to address the impacts of bottom fishing on VMEs (Australia, Canada, New Zealand, United States). In regards to assessments, Australia commissioned a study to assess the sustainability of harvest rates by Australian flagged vessels of target species in high seas fisheries, which would consider current harvest rates, limited assessments of key stocks, such

as orange roughy and alfonsino, and possible management measures. The European Union reported that Spain prepared a preliminary assessment of the risk of serious harm to VMEs and protocol performance for the 2008/09, 2009/10 and 2010/11 campaigns in order to meet the obligation in CCAMLR requiring Contracting Parties whose vessels wish to participate in any bottom fishing activity, as from December 2008, to submit such an assessment. New Zealand conducted impact assessments of all bottom fishing activities by New Zealand vessels in the CCAMLR Area, in accordance with paragraph 119 (a) of resolution 64/72. On the basis of information in assessments provided by its members and a risk assessment methodology developed by New Zealand, the CCAMLR Scientific Committee was able to quantitatively estimate the cumulative impact of bottom longline fishing in a spatially explicit format of likely impacts to date.

2. Establishment of new RFMO/As with competence to regulate bottom fisheries and adoption and implementation of publicly available interim measures

110. In paragraph 119 of resolution 64/72, the General Assembly called upon States participating in negotiations to establish RFMO/As to take a number of urgent actions in areas beyond national jurisdiction to address the impacts of bottom fisheries on VMEs and the long-term sustainability of deep-sea fish stocks. In addition, in paragraph 120 of resolution 64/72, the General Assembly called upon States participating in negotiations to establish RFMO/As to adopt and implement measures in accordance with paragraphs 83, 85 and 86 of resolution 61/105, paragraph 119 of resolution 64/72, and international law, and consistent with the FAO Guidelines, and not to authorize bottom fishing activities until such measures have been adopted and implemented. In paragraph 124 of resolution 64/72, the General Assembly also called upon relevant States to cooperate and make efforts to establish RFMO/As competent to regulate bottom fisheries where there were no such organizations or arrangements.

111. The following section describes actions taken by States participating in negotiations to establish RFMO/As to address the impacts of bottom fisheries on VMEs and the long-term sustainability of deep-sea fish stocks.

(a) North Pacific Ocean

(i) Status of negotiations

112. Negotiations on the draft convention on the conservation and management of high seas fisheries resources in the North Pacific Ocean were held in 2009 and 2010 and were successfully concluded on 4 March 2011. The text of the new Convention on the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean will be subject to a legal and technical review. Following confirmation of the English and French versions of the text, the Convention will be opened for signature.[50]

113. The treaty will enter into force once it has been ratified by four of the six States that participated in the negotiations.[51] The first preparatory conference will be held later in 2011 to develop rules of procedure, financial regulations and other

[50] Contribution of the Interim Secretariat for the Conservation and Management of High Seas Fisheries Resources in the North Pacific Ocean.

[51] Canada, China, Japan, Republic of Korea, Russian Federation and the United States.

documents needed for the establishment of the North Pacific Fisheries Commission (NPFC) when the treaty enters into force.[52] The draft NPFC Convention includes a prohibition on directed fishing for four orders of deep water corals and a mechanism for identifying other indicator species of VMEs, which would also be subject to the prohibition.[53]

(ii) Adoption of interim measures

114. Interim measures for the North West Pacific Ocean were adopted and revised by the participating States in 2007 and later revised in 2008, 2009 and 2011.[54] At the seventh intergovernmental meeting in 2009, States discussed the application of the interim measures to the entire high seas area of the North Pacific Ocean; however, consensus could not be reached. At the eighth meeting in 2010, States agreed to consider a separate set of interim measures for the North East Pacific Ocean and, until such measures were adopted, agreed on certain preliminary measures, in particular a limit of fishing effort in bottom fisheries to the existing level and the collection and submission of scientific information from each vessel operating in the area. Draft interim measures for the North East Pacific Ocean were proposed at the ninth intergovernmental meeting in 2010 and adopted in 2011. Participating States also agreed that the exploratory fisheries protocol for the North West Pacific interim measures would apply to the North East Pacific interim measures.

115. The interim measures set out the objectives of the sustainable management of fish stocks and the protection of VMEs, in accordance with resolutions 61/105 and 64/72, and included provisions on geographic scope, management principles, collection of fisheries and scientific information, establishment of a scientific working group, information sharing, and effective control of bottom fishing vessels.[55] The measures also include provisions that limit fishing effort to the existing level and do not allow for the expansion of bottom fisheries into new areas. In accordance with paragraph 83 (a) of resolution 61/105, the interim measures contain science-based criteria, consistent with the FAO Guidelines, for use in assessing whether fishing activity would have significant adverse impacts on marine species or VMEs and in proposing management measures to prevent such impacts.[55]

116. In accordance with paragraph 83 (b) of resolution 61/105, the interim measures provide for the collection of information to facilitate the scientific work associated with the implementation of the measures.[55] To this end, the interim scientific working group has been working to identify and evaluate information necessary to identify VMEs, as well as information necessary to assess whether bottom fishing activities would have significant adverse impacts on VMEs.[55] In accordance with paragraph 83 (c) of resolution 61/105, the interim measures provide exceptions to the restrictions on limiting fishing effort to the existing levels and preventing expansion of bottom fisheries into new areas only in cases where it can be shown that the fishing activity would not have significant adverse impacts on marine species or any VME.

117. A detailed exploratory fisheries protocol was established to provide guidance on the steps to be taken when conducting an exploratory fishery to ensure

[52] Contribution of the United States.

[53] Contribution of Canada.

[54] A/64/305, paras. 146-152; contributions of the Interim Secretariat and the United States.

[55] Contributions of the Interim Secretariat and the United States.

consistency with both the interim measures and resolution 61/105. In accordance with paragraph 83 (d) of resolution 61/105, vessels of participating States were required to cease fishing activities in any location where, in the course of normal fishing operations, cold water corals were encountered. In such areas, vessels were required to cease fishing activities until they had relocated no less than five nautical miles away to reduce the likelihood of future encounters, and report the encounter so that appropriate measures could be adopted in respect of the relevant site. A more detailed encounter protocol was under extensive discussion among the participating States.

(iii) Implementation of interim measures by States

118. In accordance with paragraph 83 of resolution 61/105, participating States have assessed, on the basis of the best available scientific information, whether individual bottom fishing activities would have significant adverse impacts on VMEs and the long-term sustainability of deep-sea fish stocks.[50] The results were presented to the fifth meeting of the scientific working group in 2008 for a thorough scientific review, with the hope that a unified assessment report, based on consensus, would be produced. There were differences of opinions, however, as to what management measures should be introduced in response to the findings, so it was decided that each participating State would produce or revise its own assessment, taking into account the discussion.[56]

119. Palau indicated that the assessments published by participating States in 2008 acknowledged significant uncertainties in the status of benthic fish stocks and VMEs and in the impacts of bottom fishing operations, and indicated that additional scientific information was needed before the significance of impacts, and the effectiveness of mitigation measures, could be assessed pursuant to the FAO Guidelines. Palau emphasized that, until the necessary scientific information was analysed, there was no adequate impact assessment and the only appropriate measure was to cease authorizing bottom fishing in the area.

(b) South Pacific Ocean

(i) Status of instrument

120. The eighth meeting of the international consultations to establish an RFMO in the South Pacific concluded on 14 November 2009 with the adoption of the Convention on the Conservation and Management of High Seas Fishery Resources in the South Pacific Ocean (SPRFMO Convention). The objective of the Convention is to ensure the long-term conservation and sustainable use of fishery resources through the application of the precautionary approach and an ecosystem approach to fisheries management and, in so doing, to safeguard the marine ecosystems in which these resources occur.[57]

121. Following the adoption of the SPRFMO Convention, participants at the eighth meeting of the international consultations decided to make the necessary arrangements for the commencement of the functions of the SPRFMO Commission. Two sessions of the Preparatory Conference were convened in 2010 and 2011, and a

[56] See assessments at http://nwpbfo.nomaki.jp/Assessment.html and contain details on current interim measures carried out by each participating State following the assessments reported in 2008.

[57] See art. 2 of the SPRFMO Convention.

third session will take place in Chile between 30 January and 3 February 2012.[58] Participants have begun to develop rules of procedure, financial regulations, and a budget formula for the new organization.[59]

122. In accordance with article 36, the SPRFMO Convention was open for signature until 31 January 2011. It is now subject to ratification, acceptance or approval by the signatories, in accordance with article 36, and is open for accession, in accordance with article 37.

123. The SPRFMO Convention will enter into force 30 days after the date of receipt by the depository of the eighth instrument of ratification, accession, acceptance or approval, including from at least three coastal States adjacent to the SPRFMO Convention Area, and at least three States that are not coastal States adjacent to the SPRFMO Convention Area and whose fishing vessels are fishing, or have fished, in the SPRFMO Convention Area.[59]

124. Australia reported on its ongoing domestic processes to allow for ratification of the SPRFMO Convention. Prior to the entry into force of the treaty, Australia is collecting and monitoring data on high seas fishing catch and effort to ensure that catch and effort remain within historic average levels.

125. The FFA highlighted the concerns of some of its members that the northern boundary of the proposed SPRFMO would not include the national waters of its members situated above the equator. In this regard, if the southern boundary of the proposed NPFC Convention does not meet the northern boundary of the SPRFMO Convention, a gap would exist. FFA members, such as the Marshall Islands, Kiribati, and the Federated States of Micronesia, had part of their zones covered within the area of competence of SPRFMO and it was not clear whether high seas areas adjacent to their zones would be covered by the NPFC Convention.

126. Palau noted that, although RFMO/As with competence to regulate bottom fisheries had been negotiated for the high seas areas of the North and South Pacific, the relevant conventions were not yet in force and did not cover some of the high seas areas adjacent to Palau. In particular, the high seas enclave bounded by the exclusive economic zones of Palau, Japan, the Philippines, Guam, and the Federated States of Micronesia was not covered by the areas proposed to be regulated.

(iii) Adoption of interim measures

127. In 2007, participating States agreed on voluntary, non-legally binding, interim conservation and management measures to address collection of fisheries data, avoidance of adverse effects of deep-sea bottom fishing and prevention of increasing fishing effort in pelagic fisheries.[60] The interim measures became effective from 30 September 2007 and are to apply until the SPRFMO Convention enters into force and conservation and management measures are adopted.[60] A ban on deepwater gillnetting was added to the bottom fisheries measures in November 2009.

[58] See www.southpacificrfmo.org/preparatory-conference/.

[59] See art. 38 (1) of the SPRFMO Convention for details. If within three years of its adoption the SPRFMO Convention has not so entered into force, it will enter into force six months after the deposit of the tenth instrument of ratification, accession, acceptance or approval, or in accordance with para. 1, whichever is the earlier.

[60] Also see A/64/305, paras. 163-166.

128. The interim measures on bottom fisheries provide that: (i) bottom fishing be limited to existing levels of fishing and to areas where fishing was occurring, (ii) measures be taken to identify and protect VMEs, and (iii) starting in 2010, fishing in new areas or expanded fishing effort be allowed only when conservation and management measures were established to prevent significant adverse impacts on VMEs and to ensure the long-term sustainability of deep-sea fish stocks from individual bottom fishing activities, or when an assessment indicated that such activities would have no adverse impacts.[61] Pursuant to the interim measures, vessels flying the flag of participating States are required to cease bottom fishing activities within five nautical miles of any site where, in the course of fishing operations, evidence of VMEs was encountered, and to report the encounter, including the location, and the type of ecosystem in question, so that appropriate measures could be adopted.

129. In 2007, participating States also established an interim framework for benthic impact assessments and a process for the evaluation of assessments, which provided initial guidelines in carrying out assessments and developing management plans for proposed bottom fishing activities, as well as a process for scientific comment on the assessments. In 2009, the scientific working group began a review of the interim framework for benthic assessments with a view to preparing an ongoing benthic assessment standard. Two participants had provided assessments of their bottom fishing activities, including measures to avoid adverse impacts on VMEs. The scientific working group provided evaluations of the assessments and management plans.

130. In 2007, participating States also adopted standards for data collection that required details of catches and discards of any marine species for each trawl tow or bottom longline shot. In 2011, the SPRFMO Preparatory Conference required that the data would be provided to the SPRFMO Interim Secretariat.

iiii) Implementation of interim measures by States

131. Australia reported that it implemented spatial restrictions for bottom fishing operations in the South Pacific Ocean in line with the interim measures adopted by the participants to the SPRFMO negotiations. Chile reported that any initiatives to develop new or exploratory deep-sea fishing in the high seas would be undertaken in accordance with the operating standards and protocols that had been developed in SPRFMO. Colombia expressed concerns that the measures would not become mandatory until the entry into force of the SPRFMO Convention and highlighted the importance of implementing measures that would allow for the timely and open marketing of products that were obtained by legal means. Colombia also emphasized the need for technical support to implement the recommended measures once the SPRFMO was established.

132. The European Union reported that it was complying fully with the interim measure for deepwater gillnets agreed by participating States in 2009, which effectively banned such fishing as of 1 February 2010, until relevant conservation and management measures were adopted by the SPRFMO Commission. Since only bottom gillnetting had been practised by European Union fishing vessels, there were currently no European Union vessels undertaking bottom fishing activities in the

[61] Communication of the Interim Secretariat of the SPRFMO.

SPRFMO Convention Area.[62] France reported that its overseas territories had not participated in any bottom fisheries in the SPRFMO Convention Area.

133. New Zealand reported that it continued to implement 100 per cent observer coverage on bottom trawl fishing trips. It also implemented the minimum 10 per cent observer coverage requirement in the interim measures for all bottom longline trips in the SPRFMO Convention Area. In addition, it implemented the 2009 interim measure prohibiting deep-sea gillnetting. In addition, New Zealand had begun developing a quantitative bottom fishing impact assessment using predictive habitat models to identify areas likely to support VMEs.

134. In regard to assessments, Australia reported that it completed a benthic impact assessment for the South Pacific Ocean and the Southern Indian Ocean to identify areas where VMEs were known and/or likely to occur and to assess the impact of individual bottom fishing activities on VMEs. After taking into account monitoring, management and mitigation measures, the assessments found that the risk of significant adverse impact on VMEs by Australian vessels was low for demersal trawl and demersal auto-longline and negligible for mid-water trawl and drop-lining (see sect. III.B.1 (b)). Australia would submit the assessment to the SPRFMO interim Science Working Group prior to the Scientific Committee meeting in September 2011, as required by the SPRFMO interim measures. The European Union reported that it submitted a preliminary benthic impact assessment in 2009, which concluded that likely impacts to benthic ecosystems from bottom fishing would be very low.[63] Palau noted, however, that the SPRFMO Science Working Group had dismissed this conclusion as completely unjustified.[64]

135. New Zealand reported that the SPRFMO Science Working Group had concluded that its impact assessment and related conservation measures had minimized adverse impacts on VMEs.[65] In this respect, Palau noted that the impact assessment acknowledged that bottom trawling was likely to cause significant adverse impacts to fish stocks and VMEs and that the proposed mitigation measures were inadequate in several critical respects in terms of mitigating impacts to fish stocks and VMEs.[66]

136. New Zealand also reported that its assessment had been used as the basis for the development of a management approach for New Zealand bottom trawling operations in the SPRFMO Area, which included definition of a historical bottom trawl fishing footprint over the reference years 2002-2006, development of a VME-evidence identification protocol, and a three-tiered system of spatial closures, whereby 41 per cent of the footprint area was closed to fishing, 30 per cent was

[62] See SPRFMO Interim Secretariat, *Report on Interim Management Measures* (2011). Available at http://www.southpacificrfmo.org/assets/PrepCon-2/Plenary/PrepCon-02-INF-02-Report-on-Interim-Management-Measures-Rev2.pdf.

[63] Spain, Ministerio de Medio Ambiente y Medio Rural y Marino, *Preliminary Assessment of the Risk of Cause Serious Damage to the Vulnerable Marine Ecosystems*. Available at http://www.southpacificrfmo.org/assets/8th-Meeting-November-2009-New-Zealand/SWG-VIII/SP-08-SWG-DW-02-EC-Bottom-fishing-assessment-ENG.pdf.

[64] See SPRFMO Science Working Group, *Report of the Science Working Group* (8th International Meeting 2009). Available at http://www.southpacificrfmo.org/assets/8th-Meeting-November-2009-New-Zealand/Plenary-VIII/8th-SWG-Report-Final-Adopted-6-Nov-09-JMA-apendicies-fixed-maps-fixed-24-Nov-09-5pm.pdf).

[65] New Zealand Ministry of Fisheries, *Bottom Fishery Impact Assessment* (2008).

[66] Contribution on Palau.

subject to a move-on rule if evidence of VMEs was encountered and 29 per cent of the footprint was open to fishing. The open, move-on and closed areas were stratified between eight fishing areas constituting the total footprint.

137. Palau and the United States expressed concerns that some States were conducting bottom fishing in the SPRFMO Convention Area without having completed a proper impact assessment, as called for in resolutions 61/105 and 64/72 and the SPRFMO interim measures.

(c) South Indian Ocean

(i) Status of instrument

138. The South Indian Ocean Fisheries Agreement (SIOFA) was adopted on 7 July 2006 and opened for signature until 6 July 2007 by all States and regional economic integration organizations participating in the negotiations and by any other State having jurisdiction over waters adjacent to the area of application.[67] After its closure for signature, SIOFA was opened for accession in accordance with its article 23. SIOFA will enter into force 90 days from the date of receipt by the depositary of the fourth instrument of ratification, acceptance or approval, at least two of which must be deposited by coastal States bordering the area of application.[68]

139. Australia reported on its ongoing domestic processes to allow for ratification of SIOFA. Prior to the entry into force of the treaty, Australia was collecting and monitoring data on high seas fishing catch and effort to ensure that catch and effort remained within historic average levels.

(ii) Adoption of interim measures

140. Multilateral measures implementing resolution 61/105 have not been adopted by the signatories to SIOFA to date. In October 2007, Australia indicated to SIOFA signatories and interested parties that it was interested in adopting interim measures to implement resolution 61/105 in the area of application. In early 2008, Australia circulated draft interim measures to signatories and interested parties, in an effort to progress their adoption.

141. In order to implement resolution 61/105, Australia had taken unilateral action to impose relevant conditions on its vessels operating in the area to be governed by SIOFA, once it enters into force. In addition, Australia had completed benthic impact assessments for the Southern Indian Ocean to identify areas where VMEs are known and/or likely to occur and to assess the impact of individual bottom fishing activities on VMEs. The assessments used surrogates (e.g., bathomes and seamounts) as indicators for the presence of VMEs. In assessing the risk of significant adverse impacts, the assessments considered Australia's precautionary management measures for deep-sea fisheries (see sect. III.B.1 (b)). After taking into account these monitoring, management and mitigation measures, the assessments found that the risk of significant adverse impact on VMEs by Australian vessels was low for demersal trawl and demersal auto-longline and negligible for mid-water trawl and drop-lining.

[67] See A/64/305, paras. 140 and 141.

[68] See http://www.fao.org/Legal/treaties/035s-e.htm.

142. Following the adoption of resolution 61/105, the European Union adopted Council Regulation (EC) No. 734/2008 on the protection of VMEs in the high seas from the adverse impacts of bottom fishing gears.[69] The regulation transposed the measures contained in resolution 61/105 into European Union law and applied to ships flying the flag of European Union member States carrying out bottom fishing activities in those areas of the high seas where no RFMO had been established or where no interim measures were put in place during negotiations for the establishment of an RFMO, including the Southern Indian Ocean (see sect. III.B.3 (a)).[70]

3. Measures taken by States for areas where there is no competent RFMO/A or interim measures

143. In paragraph 120 of resolution 64/72, the General Assembly called upon flag States to adopt and implement measures in accordance with paragraphs 83, 85 and 86 of resolution 61/105, paragraph 119 of resolution 64/72, and international law, and consistent with the FAO Guidelines, and not to authorize bottom fishing activities until such measures had been adopted and implemented. In this regard, paragraph 86 of resolution 61/105 called upon flag States to either adopt and implement measures in accordance with paragraph 83 of the resolution, or cease to authorize fishing vessels flying their flag to conduct bottom fisheries in areas beyond national jurisdiction where there was no RFMO/A with the competence to regulate such fisheries or interim measures in accordance with paragraph 85, until such measures were taken in accordance with paragraphs 83 or 85 of the resolution.

144. The following section describes actions taken by flag States to adopt measures and address the impacts of bottom fishing activities on VMEs in areas where there is no RFMO/A with the competence to regulate such fisheries or interim measures in place.

(a) Measures to regulate bottom fishing vessels, including closure of areas to bottom fishing

145. Some States (Canada, Iceland, Republic of Korea) and the European Union reported on the adoption and implementation of conservation and management measures to address the impacts of bottom fishing activities on VMEs for vessels fishing on the high seas where there was no competent RFMO/A or interim measures in place. Canada reported that fishing activity outside of Canada's exclusive economic zone was not significant and occurred almost exclusively in RFMO/As regulatory waters. All high seas fishing in regulated or unregulated areas and activities occurring in another State's waters were subject to domestic licensing requirements, which required compliance with domestic laws in all areas of the high seas, including areas where no RFMO existed.

146. The European Union reported that fishing vessels from European Union member States were regulated by Council Regulation (EC) No. 734/2008, which transposed the measures contained in resolution 61/105 into European Union law for ships flying flags of its member States in respect of such areas. European Union member States could only issue special fishing permits for the use of bottom fishing gears on the high seas under specific conditions and after assessments had concluded that fishing activities were not likely to have significant adverse impacts

[69] *Official Journal of the European Union*, L 201, of 30 July 2008.

[70] See arts. 8, 9 and 11 of Council Regulation (EC) No. 734/2008.

on VMEs. The regulation also contained provisions on unforeseen encounters with VMEs, area closures and an observer scheme for all vessels that had been issued a special fishing permit.

147. According to the European Union, no unforeseen encounters with VMEs had been registered in respect of the vessels subject to the regulation from Spain and Estonia. A review of the implementation of the regulation was carried out in early 2010 and the results were published in a report to the European Parliament and Council.[71] The European Commission intended to amend the regulation to bring it in line with recent developments (see sect. III.B.2 (c)).[72]

148. The European Union also reported that Spain had undertaken an ambitious and costly programme of scientific mapping of the seabed in different parts of the oceans (also see sect. III.A.2 (b)). The activities were conducted by Spain or in collaboration with other States in the North-East Atlantic, the North-West Atlantic, the South-West Atlantic and the South-East Atlantic, including in some areas not regulated by RFMO/As. The results were being published in leading scientific journals. Based on the Atlantis project, the Spanish Government had closed nine areas to bottom fishing with a total extent of 41,300 km^2, including two areas located in the footprint area where, owing to the type of seafloor, sensitive habitats might be able to recover.

149. Iceland indicated that bottom fisheries by Icelandic vessels occurred only marginally on the high seas and noted that only one Icelandic vessel had been engaged in bottom fishing for shrimp in areas beyond national jurisdiction.

150. The Republic of Korea reported that bottom fishing activities in areas where no RFMO/A was in place were regulated by an administrative directive on bottom fishing on the high seas. The regulation established a system for licensing, reporting encounters with VMEs, fishing closure and move-on rules, impact assessments, vessel monitoring system, catch reporting and other measures to prevent significant adverse impacts on VMEs. The regulation was to be revised in 2011 to incorporate observer requirements, threshold levels, enhanced impact assessments based on a review in cooperation with a wide range of stakeholders. Impact assessments had been conducted in the South-West Atlantic, but were in the initial stages, owing to the high cost of scientific research and inadequate information from vessels flying the Republic of Korea flag in the areas beyond national jurisdiction. The Republic of Korea was trying to enhance the quality of the report through accumulated information, higher coverage of observers, international cooperation, education and training, cooperation with the industry and strengthened scientific capacity.

(b) Refusal of authorization to conduct bottom fishing activities

151. Some States indicated that their vessels did not engage or were not authorized to conduct bottom fisheries in areas beyond national jurisdiction, or that their vessels did not fish outside areas regulated by RFMO/As (Chile, Croatia, Colombia,

[71] European Union Commission, "Report from the Commission to the European Union Parliament and the Council on the implementation of Council Regulation (EC) No. 734/2008 on the protection of vulnerable marine ecosystems in the high seas from the adverse impacts of bottom fishing gears", COM (2010) 651 final.

[72] Ibid., para. 17.

Denmark, France, Germany, Kuwait, Mexico, New Zealand, Palau, United States) (see sect. III.B.1 (b)).

152. Mexico emphasized that it was very important to conserve VMEs and their biodiversity as far as possible, and it thus supported an international moratorium on bottom trawling in areas outside the jurisdiction of States (i.e., the Area), especially in areas where there were fragile ecosystems, such as seamounts, hydrothermal vents and cold-water corals.

153. In this regard, Palau had banned all bottom trawling by its nationals and vessels anywhere in the world and had not authorized any vessels to engage in other types of bottom fishing in the high seas. Palauan law also prohibited companies doing business in Palau from engaging in bottom trawling anywhere in the world (also see sect. III.B.1 (a)).

154. United States flagged vessels were not currently authorized to conduct bottom fisheries in areas beyond national jurisdiction. In addition, any authorization to conduct bottom fishing on the high seas in the future would only be granted upon completion of an assessment of impacts to the environment, including on VMEs.

C. Actions taken by States and competent regional fisheries management organizations and arrangements in cooperating to collect and exchange scientific and technical data and information and develop or strengthen data-collection standards, procedures and protocols and research programmes

155. Paragraph 122 of resolution 64/72 called upon States and RFMO/As to enhance efforts to cooperate to collect and exchange scientific and technical data and information related to the implementation of the measures called for in resolutions 61/105 and 64/72 to manage deep-sea fisheries in areas beyond national jurisdiction and to protect VMEs from significant adverse impacts of bottom fishing by taking a number of actions, as described below. Paragraph 123 of the resolution also encouraged States and RFMO/As to develop or strengthen data-collection standards, procedures and protocols and research programmes for identification of VMEs, assessment of impacts on such ecosystems, and assessment of fishing activities on target and non-target species, consistent with the FAO Guidelines and in accordance with the Convention.

156. Several RFMO/As, as well as States and the European Union, described general efforts to enhance cooperation in the collection and exchange of scientific and technical data and information relating to the implementation of resolutions 61/105 and 64/72 in addressing the impacts of bottom fishing on VMEs and deep-sea fish stocks. GFCM reported that it enjoyed the support of FAO projects at subregional and regional level which enhance, in particular, scientific cooperation and capacity-building in participating countries. GFCM also cooperated closely with a number of regional and intergovernmental and non-governmental organizations dealing with the conservation of the marine environment and living marine resources, including the United Nations Environment Programme/Mediterranean Action Plan Regional Activity Centre for Specially Protected Areas. The GFCM subcommittee on the marine environment and ecosystem was working to establish

links with existing regional bodies concerned with studies on the relationship/interaction between environment and marine ecosystems.

157. NAFO had a well developed infrastructure for the collection and exchange of scientific and technical data and information. Both the NAFO Fisheries Commission and the Scientific Council had permanent standing committees that dealt with the exchange of information related to the fisheries. In 2010, the NAFO working group on ecosystem approach to fisheries management informally agreed to share coral and sponge data from research surveys. Joint research programmes were also conducted, such as the NEREIDA surveys (see sect. III.A.2 (b)).

158. NEAFC had internal standards and requirements for reporting and data exchange, but also relied on ICES to facilitate exchange of knowledge, scientific assessments and the review of proposals with regard to fisheries regulations, VME issues, and data-collection protocols. ICES provided updates to NEAFC on scientific issues of relevance and responded to regular and special requests on fisheries and VME issues. The basic compilation and exchange of knowledge was the responsibility of expert groups.

159. NEAFC also actively cooperated with other organizations in the North-East Atlantic with a mandate to regulate human activity that had an impact on marine biodiversity, including regular meetings and contacts with other RFMO/As. It entered into agreements for this purpose with the Commission for the Protection of the Marine Environment of the North-East Atlantic (OSPAR Commission) and the International Maritime Organization, and it was considering this possibility with the International Seabed Authority. NEAFC also recently decided to play an active role in supporting and organizing a regional workshop for the North-East Atlantic, pursuant to the decision of the Conference of the Parties to the Convention on Biological Diversity in 2010 on marine and coastal biodiversity.[73]

160. In respect of Greenland, Denmark reported that data collaboration on VME organisms was in an early phase, and that collaboration with Canadian scientists and the Danish Zoological Museum was being explored. The European Union reported that Spain had utilized fisheries oceanographic and cooperation vessels to provide training in a number of countries in Africa and Latin and South America, on research and data collection, basic safety on board, use of selective fishing gear, oceanography, fisheries control, and institutional strengthening.

161. New Zealand commissioned a research project on the development of estimates of annual sustainable catches and of sustainable feature limits for orange roughy bottom trawl catches in the proposed SPRFMO Convention Area. The United States reported on exploratory investigations with Indonesia on the diversity and distribution of deep-sea habitats and marine life in Indonesian waters within the Coral Triangle region, on a multi-year collaboration to characterize deep-sea coral habitat in the Gulf of Mexico and on a bilateral workshop with New Zealand on ocean and marine biosciences that focused on cooperative research on cold-water corals and other VMEs in the Pacific Basin.

162. In regards to capacity-building, GFCM reported that it regularly responded to requests from its members to strengthen the capacity of national research institutions in the field of data collection, stock assessment and fisheries

[73] See Convention on Biological Diversity decision X/29 on marine and coastal biodiversity.

management. Technical support was given directly to these countries through the FAO Mediterranean subregional projects. SEAFO reported that it had established a special requirements fund to assist developing coastal States in the region in the conservation, management and development of fishery resources. It had also given full recognition to the needs and special requirements of developing States in the region pursuant to article 21 of the SEAFO Convention.

1. Measures taken by States and RFMO/As to implement paragraphs 122 (a)-(d) and 123 of resolution 64/72

163. The following section describes actions related to the implementation of resolution 64/72 to enhance cooperation in the collection and exchange of scientific and technical data and information and the development or strengthening of data-collection standards, procedures and protocols and research programmes.

(a) Exchanging best practices and developing regional standards

164. In paragraph 122 (a) of resolution 64/72, the General Assembly called upon States and RFMO/As to exchange best practices and develop, where appropriate, regional standards for use by States engaged in bottom fisheries in areas beyond national jurisdiction and RFMO/As with a view to examining current scientific and technical protocols and promoting consistent implementation of best practices across fisheries and regions, including assistance to developing States in accomplishing these objectives.

165. The NAFO Scientific Council regularly sponsored international scientific symposia, as well as workshops, to share information on specific scientific topics, such as the use of Geographic Information Systems in stock assessment and ageing workshops for fish species, in which information about techniques used by various countries could be shared and examined. NAFO participated in a joint ICES/NAFO expert working group on deepwater ecology, which included scientists from NAFO and NEAFC Contracting Parties and various States. The expert group reported annually to the advisory forums in NAFO and ICES and provided a forum for the exchange of scientific knowledge and data, techniques and best practices on issues related to VME science, such as identification and delineation. NAFO was also part of the group responsible for the North-Atlantic Format standard, which was used for VMS communication in the North-Atlantic and was being considered by other RFMOs for their possible use.

166. In CCAMLR regional standards expected to be met by States are provided in the form of conservation measures, while in SPRFMO the interim measures and assessment framework provide the regional standards. The scientific bodies of these RFMOs assessed the performance of members against these standards to ensure adherence.[48] The responsibilities and functions of SEAFO Contracting Parties, as well as flag State and port State duties in data sharing, were also contained in the SEAFO Convention.

167. Australia reported that its longstanding participation and lead role in CCAMLR provided a strong basis on which to share scientific information and best practices for bottom fishing activities. Australia was also a key contributor of best practices to other international fisheries management organizations, such as the Western and Central Pacific Fisheries Commission. Being a signatory to both the SPRFMO Convention and SIOFA allowed Australia to share information and

implement conservation and management measures using the most accurate information.

168. Canada reported that its international governance strategy sought to enable greater international consensus and capacity-building, including improved knowledge, management, standards, and agreements, to advance the implementation of sustainable practices worldwide. Canada contributed to the funding and support of scientific research and international collaboration to deliver on these commitments. Areas of focus for research included identification, characterization and mapping of VMEs, the development of rapid, cost-effective methods for detecting VMEs, assessment of significant adverse impacts and recoverability, and research and advice for the development of science-based encounter protocols.

169. Italy reported that it participated in a series of scientific research collaboration and cooperation projects with neighbouring coastal States to create the conditions for a future application of shared rules by their fleets.

(b) Making assessments and adopted measures publicly available

170. In paragraph 122 (b) of resolution 64/72 the General Assembly called upon States and RFMO/As to make publicly available, consistent with domestic law, assessments of whether individual bottom fishing activities would have significant adverse impacts on VMEs and the measures adopted in accordance with paragraphs 83, 85 and 86, as appropriate, of resolution 61/105, and to promote the inclusion of this information on the websites of RFMO/As.[74]

171. RFMOs with competence to regulate bottom fisheries reported that they maintained websites that detailed and publicized measures that had been adopted in accordance with resolutions 61/105 and 64/72.[75] Pursuant to paragraph 85 of resolution 61/105, the interim secretariats of SPRFMO and NPFC also maintained websites that publicized interim measures and assessments.[76]

172. With regard to the activities of States, Australia reported that it would submit its bottom fishing impact assessment to SPRFMO, as required by the SPRFMO interim measures. Australia would also submit the findings of its benthic impacts project, which was undertaken through multi-stakeholder cooperation to the CCAMLR Commission in 2011. Its conservation and management measures were otherwise publicly available through the bottom fishing impact assessments. The European Union reported that the results of its review of Council Regulation (EC) No. 734/2008 on the protection of VMEs in the high seas from the adverse impacts of bottom fishing gears were published in a report from the Commission to the European Parliament and Council. New Zealand reported that its SPRFMO and CCAMLR impact assessments were publicly available on the relevant websites.

---

[74] See resolution 61/105, paras. 84 and 87.

[75] See www.ccamlr.org; www.gfcm.org/gfcm/en; www.nafo.int; www.neafc.org; and www.seafo.org. The CCAMLR VME taxa classification guide is available at www.ccamlr.org/pu/e/sc/obs/vme-guide.pdf. The full range of measures adopted by GFCM are available in an e-Compedium on its website: http://151.1.154.86/GfcmWebSite/e-Compendium/info.html.

[76] See www.southpacificrfmo.org and http://nwpbfo.nomaki.jp/index.html. Information on the SPRFMO interim framework for benthic impact assessments is also available at www.southpacificrfmo.org.

(c) Submission by flag States of lists of authorized vessels and adopted measures to FAO

173. In paragraph 122 (c) of resolution 64/72, the General Assembly called upon flag States to submit to the FAO a list of those vessels flying their flag authorized to conduct bottom fisheries in areas beyond national jurisdiction, and the measures they have adopted to give effect to the relevant paragraphs of resolutions 61/105 and 64/72.

174. Australia maintained a register of Australian flagged vessels authorized to fish on the high seas and it submitted to FAO the list of the seven such vessels currently under Australian fishing permits. Croatia regularly transmitted data on its fleet that was authorized to fish, including bottom trawlers, to relevant RFMOs, such as GFCM and ICCAT. New Zealand provided a list to FAO of flagged vessels that had approval to fish on the high seas using bottom fishing methods.

175. The Republic of Korea reported that it provided a list of vessels flying its flag that were authorized to conduct bottom fisheries in areas beyond national jurisdiction, measures it had adopted, and an impact assessment report to FAO. It planned to submit relevant information to FAO at least on an annual basis to contribute to global efforts to protect VMEs from bottom fishing activities in areas beyond national jurisdiction.

176. The United States reported that it did not authorize any of its vessels to conduct bottom fisheries in areas beyond national jurisdiction and, therefore, it did not have a list of vessels or measures to make publicly available through FAO.

(d) Sharing information on vessels engaged in bottom fishing where the flag State responsible cannot be determined

177. In paragraph 122 (d) of resolution 64/72, the General Assembly called upon States and RFMO/As to share information on vessels that were engaged in bottom fishing operations in areas beyond national jurisdiction where the flag State responsible for the vessels could not be determined.

178. GFCM reported that it had recently adopted a list of vessels that were presumed to be carrying out IUU fishing in the GFCM area. SEAFO also published an authorized vessel list and an IUU vessel list on its webpage, which were updated annually.

179. NEAFC had two main tools to combat IUU fishing that were part of its scheme of control and enforcement, namely the blacklisting of vessels under flags of non-Contracting Parties to NEAFC and a port state control system, which controlled the landings of frozen fish into foreign harbours in the NEAFC Convention Area. The NEAFC secretariat was required to transmit the IUU permanent list of vessels to the secretariats of CCAMLR, NAFO and SEAFO, as well as other RFMOs. Upon receiving notification from CCAMLR, NAFO and SEAFO of vessels that had engaged in IUU fisheries, the NEAFC secretariat was also required to place the non-Contracting Parties vessels on its permanent list. The arrangement had been operational with SEAFO and NAFO, but not CCAMLR.

180. Australia reported that its participation in a number of RFMOs provided it with an avenue for sharing scientific research outcomes and collaborating on future research, as well as uniform practices on fisheries issues. Japan reported that it

presented information on three fishing vessels whose fishing activities seemed to be inconsistent with resolutions 61/105 and 64/72 at the tenth multilateral meeting of NPFC in March 2011. Japan attempted to contact each flag State if the flag was known, but it had not received satisfactory replies.

181. New Zealand conducted aerial patrols in the Pacific and Southern Oceans and supplied detailed information on IUU vessels or illegal activities to the relevant RFMO/As to be shared with other members.

(e) Developing or strengthening of data-collection standards, procedures and protocols and research programmes

182. In paragraph 123 of resolution 64/72, the General Assembly encouraged States and RFMO/As to develop or strengthen data-collection standards, procedures and protocols and research programmes for identification of VMEs, assessment of impacts on such ecosystems, and assessment of fishing activities on target and non-target species, consistent with the FAO Guidelines and in accordance with the Convention.

183. GFCM reported that it had developed several data-collection standards and procedures to be followed by its members. NAFO prescribed requirements for exploratory fishing in new areas where fishing gear was likely to contact the seafloor, including a trip report that would be forwarded to the NAFO Scientific Council, as well as a data-collection form containing fishing trip, gear and fishing and catch information. SEAFO adopted protocols regarding the collection and reporting of scientific data that were revised annually by the SEAFO Scientific Committee to improve data collection. Conservation measures to address the protection of VMEs were also adopted by the SEAFO Commission in 2009 and 2010.

184. Regarding the activities of States, Canada reported that its international governance strategy funded science projects between 2009 and 2011 in support of the identification and protection of VMEs, including the development of guidance and procedures for the identification of VMEs and mapping of VMEs, the development of scientific and technical guidance to identify, describe and assess activities that may have significant adverse impacts on marine biodiversity, and the development of guidance for science-based impact assessments.

185. New Zealand played a leading role in the scientific work on bottom fishing in the CCAMLR Area. In 2010, New Zealand submitted 11 papers to the CCAMLR Scientific Committee and its working groups on VMEs, including work on developing an impact assessment methodology, creating a glossary of terms and conceptual framework to assess VME impacts and producing a benthic invertebrate taxa identification guide, all of which were adopted by CCAMLR.

186. In the SPRFMO Area, New Zealand reported that it was currently working on a quantitative risk assessment approach using deepwater coral predictive habitat models to identify areas where coral VMEs were likely to occur. New Zealand used a predictive habitat model to develop first estimates of potential orange roughy biomass on known features within the New Zealand bottom fishing footprint in the SPRFMO Area as a basis for making recommendations on likely sustainable orange roughy catches in these areas.

187. The United States reported that, in the context of NAFO, measures were being adopted to implement a more comprehensive data-collection protocol for coral and sponge species encountered in exploratory and existing fishing areas. The United States also engaged in other relevant international forums on assessing scientific information and identifying areas that should be closed to fishing activities, including in the work of the OSPAR Commission and ICES.

IV. Activities of the Food and Agriculture Organization of the United Nations to promote the regulation of bottom fisheries and the protection of vulnerable marine ecosystems

188. In paragraph 125 of resolution 64/72, the General Assembly expressed appreciation to FAO for its important work in providing expert technical advice on the management of deep-sea fisheries in areas beyond national jurisdiction and the protection of VMEs from the impacts of fishing and encouraged FAO in its further work in relation to the implementation of the FAO Guidelines. In paragraph 126 of resolution 64/72, the General Assembly welcomed the FAO programme proposal for deep-sea fisheries in the high seas on ensuring sustainable use of marine resources and protection of VMEs, including the development of support tools and a database on VMEs, and invited States to support the programme so that its elements might be finalized as a matter of priority. In addition, in paragraph 127 of resolution 64/72, the General Assembly invited FAO, working with other relevant international governmental organizations, to consider means to support flag States and RFMO/As in their implementation of paragraphs 83 to 87 of resolution 61/105 and paragraphs 119 to 122 of resolution 64/72.[77]

189. As reflected in resolutions 61/105 and 64/72, FAO has initiated a programme for deep-sea fisheries in the high seas with the aim of assisting States, institutions, the fishing industry and RFMO/As in the implementation of the FAO Guidelines. The programme seeks to establish a knowledge baseline in relation to these fisheries and related ecosystems and improve the current management systems through better information, engagement and communication among stakeholders, together with capacity-building activities. It consists of four major components: (i) tools to aid in the implementation of the FAO Guidelines; (ii) a database of high seas VMEs and related information; (iii) area specific demonstration and pilot implementation activities for enhanced management of deep-sea fisheries; and (iv) global coordination, monitoring and evaluation, and dissemination of information.[78]

190. In the implementation of the FAO programme, a list of authorized vessels to fish in deep-sea fisheries in the high seas provided by States has been made public on the FAO website.[79] An electronic discussion forum and network of deep-sea fisheries experts had also been initiated to facilitate communication. In addition, FAO was developing a collection of historical deep-sea fisheries data on the South-East Atlantic, which would serve to support the RFMO and States in their management of fisheries and protection of VMEs. Future activities of the FAO programme included developing guidance on impact assessments, encounter

[77] See resolution 61/105, paras. 88-90, and A/64/305, paras. 190-199.

[78] Contribution of FAO. See also www.fao.org/fishery/topic/4450/158143/en.

[79] See ftp://ftp.fao.org/FI/DOCUMENT/UNGA/deep_sea/UNGA61_105.pdf.

protocols and related mitigation measures such as the move-on rule, as well as thresholds and indicator species for VMEs.

191. At the request of the Global Environment Facility (GEF), FAO had also taken the lead in the development of a GEF global programme on sustainable fisheries and conservation of marine biodiversity in areas beyond national jurisdiction. FAO, in collaboration with partners, is developing the programme and potential supporting projects, which will include activities and projects on deep-sea fisheries and marine conservation in the high seas.

192. Some States expressed appreciation for the role of FAO, or described their participation in the work of FAO in the management of deep-sea fisheries in the high seas and the protection of VMEs and in implementing the commitments contained in resolutions 61/105 and 64/72 (Canada, Colombia, Denmark, France, New Zealand). States also indicated that FAO should continue to improve the FAO Guidelines to achieve an adequate level of protection of vulnerable habitats from bottom trawling in the high seas.

193. It was also suggested that FAO should undertake technical work in the following five priority areas to assist States and RFMOs implement resolutions 61/105 and 64/72 and the FAO Guidelines: (i) improving and expanding application of the criteria for the identification of VMEs beyond corals, sponges, seamounts and hydrothermal vents; (ii) developing guidance on impact mitigation measures and best practices for developing and applying encounter protocols relevant to VMEs, particularly by RFMOs; (iii) developing guidance on what and how information should be collected to implement measures for managing fishery impacts on VMEs; (iv) defining certain terms that could clarify implementation of the FAO Guidelines; and (v) developing guidance on best practices for conducting assessments.

194. FFA indicated that small island developing States in its region would require capacity-building and technical and financial assistance in order to support the implementation of the FAO Guidelines and initiatives introduced at the international level. In this regard, the FFA secretariat sought consideration from FAO in regards to capacity-building and the provision of technical assistance in conducting assessments.

A. Developing tools for the implementation of the International Guidelines for the Management of Deep-sea Fisheries on the High Seas of the Food and Agriculture Organization of the United Nations

195. The FAO Guidelines were developed at the request of the FAO Committee on Fisheries at its twenty-seventh session in 2007 and adopted at an FAO Technical Consultation in 2008.[80] They were designed to provide guidance on management factors ranging from an appropriate regulatory framework to the components of a good data-collection programme, and include the identification of key management considerations and measures necessary to ensure the conservation of target and non-target species, as well as affected habitats. The FAO Guidelines set out a management framework to assist States and RFMO/As in formulating and

[80] See A/64/305, paras. 194-196.

implementing appropriate measures for the management of deep-sea fisheries in the high seas.[51]

196. FAO continued its work to assist in the implementation of the FAO Guidelines through the development of tools and guidance for States and RFMO/As. The Workshop on the Implementation of the FAO International Guidelines for the Management of Deep-sea Fisheries in the High Seas: Challenges and Ways Forward, held in Busan, Republic of Korea, from 10 to 12 May 2010, analysed challenges in the implementation of the FAO Guidelines and recommended FAO to conduct further evaluations in the future, since progress on implementation was still in the early stages.[52]

197. Specific recommendations to improve the implementation of the FAO Guidelines included support in the development of new RFMO/As; support to developing countries; making available best practices and guidance on impact and risk assessment, encounter protocols and related mitigation measures; support in stock assessments; development of guidance on VME criteria, including thresholds and indicator species; and facilitation of communication and information sharing.[53]

B. Establishing a global database of information on vulnerable marine ecosystems beyond national jurisdiction

198. FAO reported that it was developing a database of information relevant to VMEs in areas beyond national jurisdiction. The database would improve the dissemination of information on VMEs and enable more responsible bottom fisheries and assist States in assessing the impacts of bottom fisheries on such ecosystem. User-friendly species identification guides would also be published in order to assist in improving information on deep-sea species.[54]

199. In order to avoid duplication, some States suggested that FAO should coordinate with the United Nations Environment Programme and the Convention on Biological Diversity in efforts to develop a database of information on ecologically and biologically significant areas.[54] Canada likewise reported that it supported a multi-faceted approach to protecting high seas biodiversity. France reported that it would contribute $400,000 for the development of the database.

200. SEAFO reported that it was committed to contributing to the database, where possible. Information on VMEs acquired through a recent bathymetric mapping of possible VMEs in the SEAFO Convention Area had also been shared with the international South Atlantic MAR-ECO project led from Brazil.

[51] See www.fao.org/docrep/011/i0816t/i0816t00.htm and http://www.fao.org/fishery/topic/4440/en.

[52] Contribution of FAO.

[53] See A/66/70, para. 41.

[54] See Convention on Biological Diversity decision X/29 on marine and coastal biodiversity, see also A/66/70, para. 163.

V. Concluding remarks

201. New research has highlighted the great diversity in composition and ecological characteristics of VMEs, on the biology of relevant organisms and on the spatial scales of VMEs. While many fish species occur on, or are associated with, VMEs and are members of VME communities, the nature of the relationship may vary, and many benthic fish species also frequent other structured habitats not currently defined as VMEs.

202. Compared with global landings from fisheries, deepwater landings are small, but the impacts of deep-sea fishing can be significant. Documented negative impacts of bottom fishing gear on VMEs range from localized depletion, loss of habitat complexity, shifts in community structure and changes in ecosystem processes. Damage to some VMEs appears to be lasting and recovery will take decades or more. Some major coral reefs have likely been lost forever and the recovery of depleted fish populations will take a long time.

203. Substantial progress has been made by States and RFMO/As to implement the relevant paragraphs of General Assembly resolutions 61/105 and 64/72. All RFMOs with competence to regulate bottom fisheries have adopted measures and have taken action to implement the resolutions, but the actions have varied. In some RFMO/As, new fishing areas, comprised of both completely unfished areas and areas that may have been fished in the distant past, have been effectively closed. In those RFMO/As current fishing activity has been essentially limited to relatively small existing fishing areas, under certain conditions and regulations. Measures range from area closures and technical regulations to general regulations aimed at conserving resources and biodiversity, with particular focus on VMEs. Some measures have been described as temporary and would need revision as new information becomes available.

204. Requirements for impact assessments have been implemented by CCAMLR, NAFO, NEAFC and SEAFO, but the requirements vary. In addition, new or revised data-collection protocols and reporting procedures have been implemented, the use of scientific observers has increased and VME identification guides have been developed or are in progress. These RFMOs have also established thresholds on bycatch of VME indicator species to indicate encounters with potential VMEs, as well as regulations describing actions to be taken by fishing vessels. NAFO and NEAFC have re-evaluated initial thresholds to lower the thresholds for sponges and corals, but other indicator species have not been identified in NAFO, NEAFC or SEAFO. Actual encounters have only been reported in CCAMLR.

205. Efforts by States participating in negotiations to establish new RFMOs in the Pacific Ocean have culminated in the adoption of the SPRFMO Convention and the successful conclusion of negotiations for the North Pacific Ocean. Interim measures have been adopted and scientific mechanisms have been established to implement these measures until the respective treaties enter into force.

206. Many States have adopted measures for areas within and beyond national jurisdiction to complement the measures introduced by RFMOs. Some States have also adopted measures for vessels fishing in areas where there was no RFMO, or interim measures in place. The diversity and level of reporting from States was considerable.

207. Relatively little information was provided on the exchange of procedures, best practices and standards between RFMO/As and States. While there are regional differences, many measures are similar or compatible across several RFMO/As. Research activities are being conducted in some regions to explore poorly known deepwater ecosystems or map VMEs and monitor deepwater resources, but it was not possible to determine whether this activity had increased due to actions being taken in RFMO/As.

208. If fully implemented, resolutions 61/105 and 64/72, as well as the FAO Guidelines, provide the tools necessary to protect VMEs from significant adverse impacts due to bottom fishing and to ensure the long-term sustainability of deep sea fish stocks. While significant actions have been taken, implementation of the resolutions continues to be uneven and further efforts are needed. As the experience of States and RFMO/As with adopted measures is ongoing, the basis for a comprehensive evaluation of their effectiveness in regulating fisheries, facilitating recovery and conservation of resources and protecting VMEs is still limited.

Annex

List of respondents to the questionnaire

States

Australia

Bulgaria

Canada

Chile

Colombia

Croatia

Denmark

France

Germany

Iceland

Italy

Japan

Kuwait

Mexico

New Zealand

Norway

Palau

Republic of Korea

United States of America

Regional economic integration organizations

European Union

United Nations specialized agencies

FAO

Regional fisheries management organizations and arrangements

CACFish

CCAMLR

CCSBT

FFA

GFCM

NAFO

NASCO

NEAFC

NPFC

SEAFO

SPRFMO

WCPFC